HP Color LaserJet 9500 Series Printers - PQ Defects Guide

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Frequency of print defects
Image formation troubleshooting
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Wide horizontal streak
Light marks (98 mm dot in single color)
98 mm repeating marks of one color on all test pages
45 mm repeating marks of one color on all test pages
98 mm ghost (shadows of the test bars in the second column)
140 mm ghost (shadows of the test bars in the third column on any test page)
ITB Cleaning blade not properly latched (can also cause 59.AO error) or nicked
Color plane fades in scan direction
Roller marks on glossy or plastic media such as HP Tough Paper
Auger marks
Random light or dark spots (ITB damage)
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Hand print on ITB
Cleaning blade tuck (cleaning blade failures)
Yellow development accross the page
Dropped or missing color planes
Completely missing color plane
Cleaning Blade ghost (cleaning blade failure)
Washed out or missing color, toner on edges of paper due to cleaning blade failure
Discharge marks
T2 not in contact
Toner explosion
Oil stains and cooling marks
Fine pitch banding
Ring Marks
OPC surface contamination
Fuser flats
ITB drive gear slip (color plane misalignment)
Dunes
Belt wave
Front or rear edge drop out
Yellow dots - 47 mm bands
Gloss level variation
Fuser wrinkles
Process cartridge drag
Toner agglomerations
ITB backing roller T2 contamination
T2 roller not raised (flock of birds patterns)
Mottled halftones
Arc - T2 bushing
Arc - Post charger corona
Beautiful arc
4.5 mm streaks

Very narrow margin on long edge of duplexed 11 by 17 page
Defects with no samples

Introduction

Welcome to the HP Color LaserJet 9500 Series Printers PQ Defects Guide. This guide will be updated as needed to reflect new information. This is version 1.2.

Last Updated: 12-July-2004

WARNING:

The information contained in this guide is HP Confidential.

New issues

New issues will be reviewed thoroughly. Please send any suggestions to david.dobkins@hp.com

Description of PQ Direction - Scan versus Feed (also called Process) direction

When troubleshooting PQ defects it is important to understand the difference between two terms commonly used to describe the orientation and direction the defects have on printouts, scan direction and feed direction. Note the information in the PQ Defect descriptions that refer to this, it is very important when troubleshooting PQ Defects.

During image formation, the Laser Scanner beam moves back and forth in what is called the **SCAN** direction as the paper passes through the printer.

Paper is fed or processed through the printer in this direction, this is referred to the **FEED** or **PROCESS** direction.

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Repetitive defect distances

Consumable	Distance (in millimeters)
Black Developer Roller	27 mm
CMY Developer Roller	30 mm
Charge Roller	45 mm
T1 Backing Roller (four, on ITB)	52 mm
T2 Roller	71 mm
T2 Backing Roller (on ITB)	73 mm
OPC (four)	98 mm

ITB Drive Roller	100 mm
Cleaning Backing Roller	100 mm
Space between T1 rollers	100 mm
Fuser Bottom Roller	140 mm
Fuser Top Roller	148.5 mm

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Frequency of print defects

One of our goals is to capture and preserve PQ defect corner cases: these are isolated cases for specific print quality defects.

The following are PQ defects that have been grouped according to frequency, **One** being the **Most Common** and **Five** being the **Least**. PQ defects that have a frequency of **Five** should be considered corner cases.

1. Most Common

- Narrow Horizontal Streak
- Wide Horizontal Streak
- Light Marks
- 98 mm Repeating Marks
- ITB Cleaning Blade not Latched
- 45 mm Repeating Marks
- 140 mm Ghost
- Roller Marks

2. Commonly seen

- Auger Marks
- Random Light or dark Spots (ITB damage)
- Rib Marks/Discharge Marks
- Scratches
- Hand Print on ITB

3. Occasionally seen

- Cleaning Blade Tuck
- Dropped or missing Color Planes
- Completely Missing Color Plane
- Cleaning Blade Ghost (cleaning failure)
- Washed Out or Missing Color Cleaning Blade Failure
- Discharge marks
- T2 Not in Contact
- Toner Explosion
- Oil Stains and Cooling Marks

4. Seldom seen

- Fine Pitch Banding
- OPC Surface Contamination
- Fuser Flats
- ITB Drive Gear Slip
- Dunes
- Belt Wave
- Wavy Brush Pattern
- Front or Rear Edge Drop Out
- Thin White Line in Black
- Yellow Dots
- Fuser Offset

5. Seldom, if ever seen

- Fuser Wrinkles
- Process Cartridge Drag

- Toner Agglomeration
- T2 Backing Roller Contamination
- T2 Not raised (flock of birds)
- Arc - T2 Bushing
- Mottled Halftones
- Arc - Post Charger Corona
- Beautiful Arc
- 4.5 mm Streaks
- Other defects with no samples

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Image formation troubleshooting

The image formation system is the central hub of the printer. During image formation, an image of colored toner is formed and then fused onto the paper. The image formation system consists of the following physical components:

- Four Laser Scanners
- Four Print Cartridges
- Four Imaging Drums
- Image Transfer Belt
- Cleaning Blade
- Fuser

NOTE:

The ITB cleaner should be removed, then reinstalled and properly latched into the position as part of any print quality troubleshooting. It is not real intituitive when the ITB cleaner is latched properly, it can appear to be latched properly when in fact it is not.

Collecting Print samples from customers: If the customer is experiencing any print quality issue, print samples before dispatching service or POP/CREWING any consumables. Have the customer print the **PQ Assessment Pages and Color Band Test** from the control panel of the printer and send them in for analysis. These selections are located under the Diagnostics Menu option. Select PQ Troubleshooting or Color Band Test from the Diagnostics Menu to print the Diagnostic pages and Color Band test. Follow the instructions on pages one and two, Figures 1 and

2 below are examples of these two pages, followed by an example of the Color Band test.

Figure 1: PQ troubleshooting page one

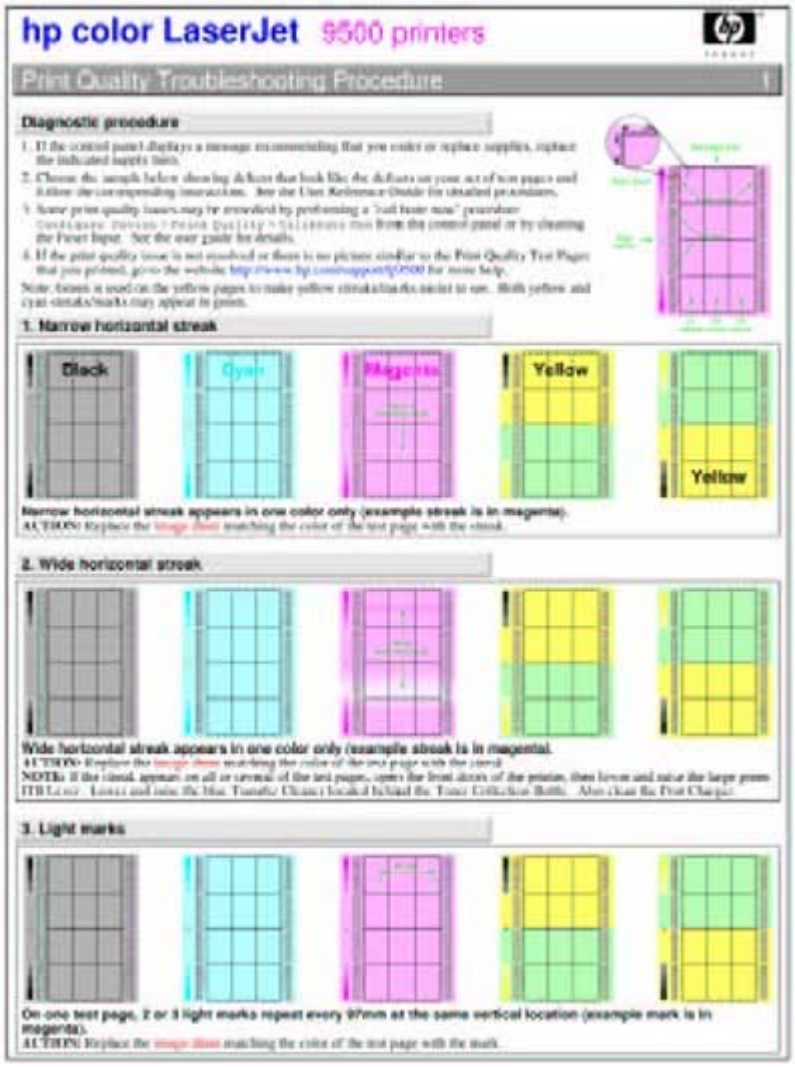


Figure 2: PQ troubleshooting page two

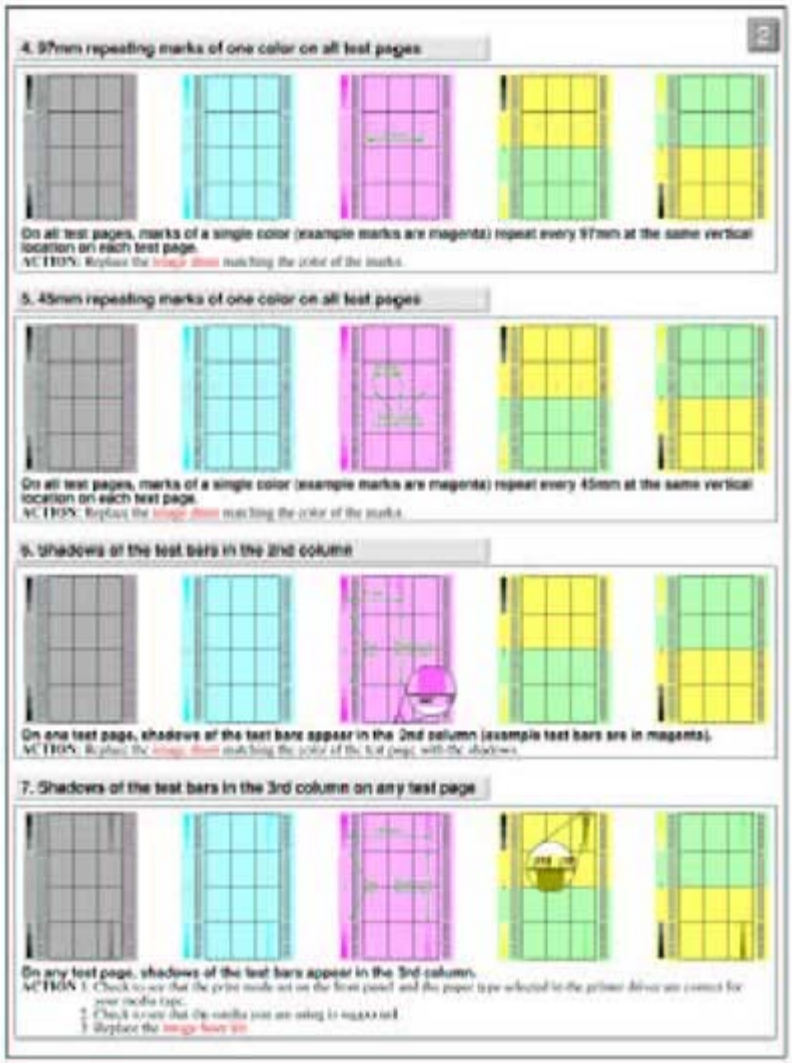
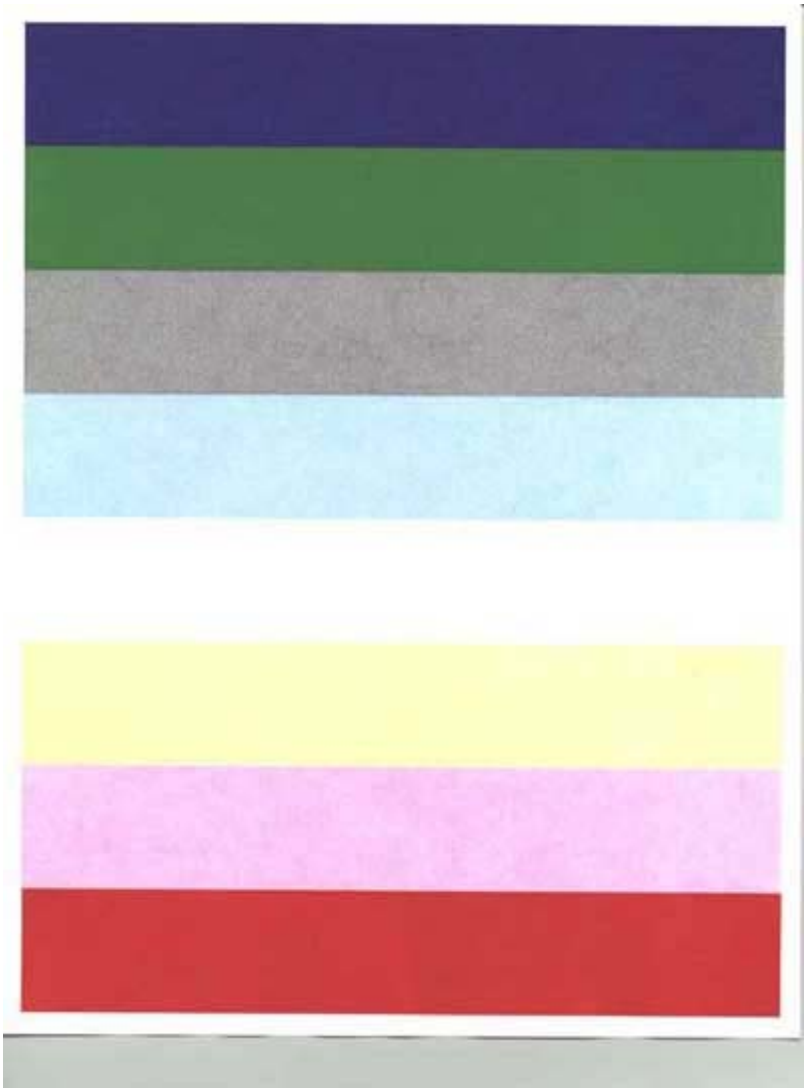

4. 97mm repeating marks of one color on all test pages
On all test pages, marks of a single color (example marks are magenta) repeat every 97mm at the same vertical location on each test page.
5. 45mm repeating marks of one color on all test pages
On all test pages, marks of a single color (example marks are magenta) repeat every 45mm at the same vertical location on each test page.
6. Shadows of the test bars in the 2nd column
On one test page, shadows of the test bars appear in the 2nd column (example test bars are in magenta).
7. Shadows of the test bars in the 3rd column on any test page
On any test page, shadows of the test bars appear in the 3rd column.

Figure 3: Color band test



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Narrow horizontal streak (parallel to feed direction)

Frequency 1

Figure 4: Narrow horizontal streak sample 1

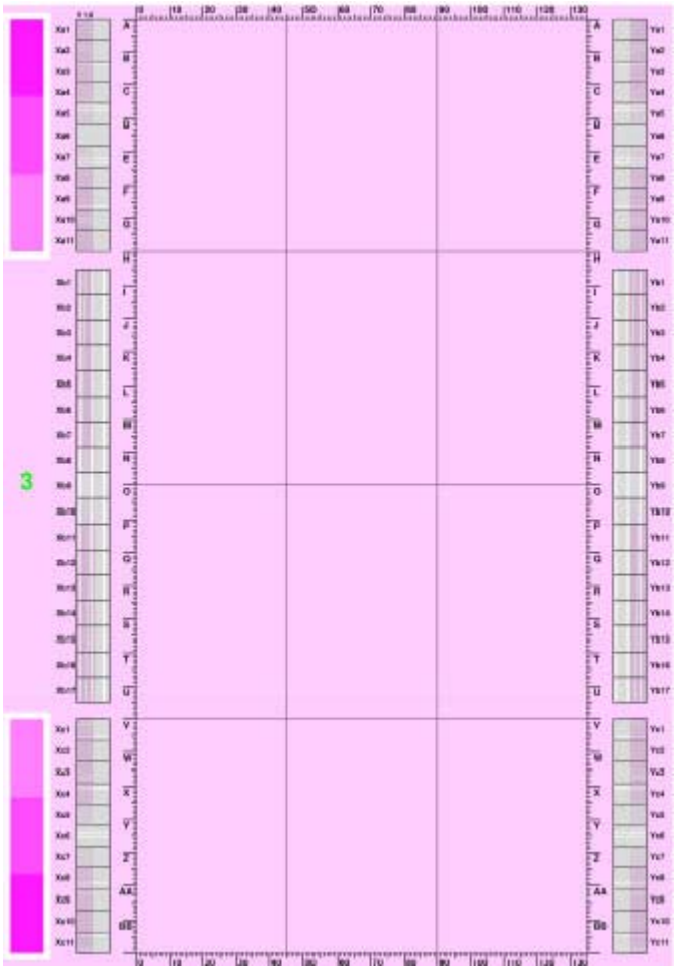
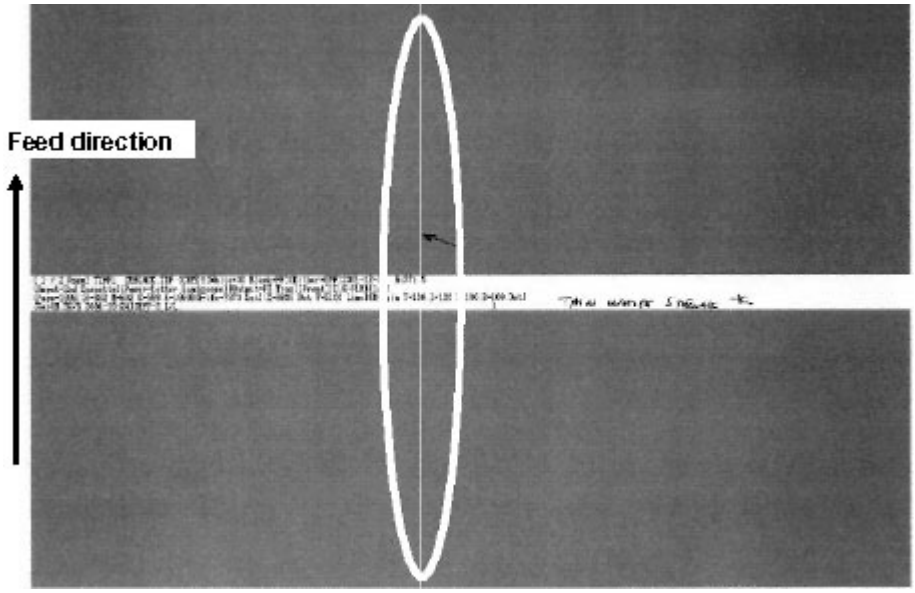


Figure 5: Narrow horizontal streak sample 2



Defect description

Narrow horizontal streak (parallel to the feed direction) appears in one color only.

Possible causes

Scratch around the OPC of the affected color. If appears on all color planes, the cause may be a scratch around a fuser roller.

Troubleshooting and suggestions

1. Run the PQ Assessment Pages to isolate to a particular color plane.
2. Replace Image Drum of Color Indicated
3. If the defect shows up in all color planes, look for physical obstructions in the paper path anywhere after the four T1 stations and inspect the fuser rollers for scratches.
4. See also, rib marks, scratches, and discharge marks in this guide for further assistance.

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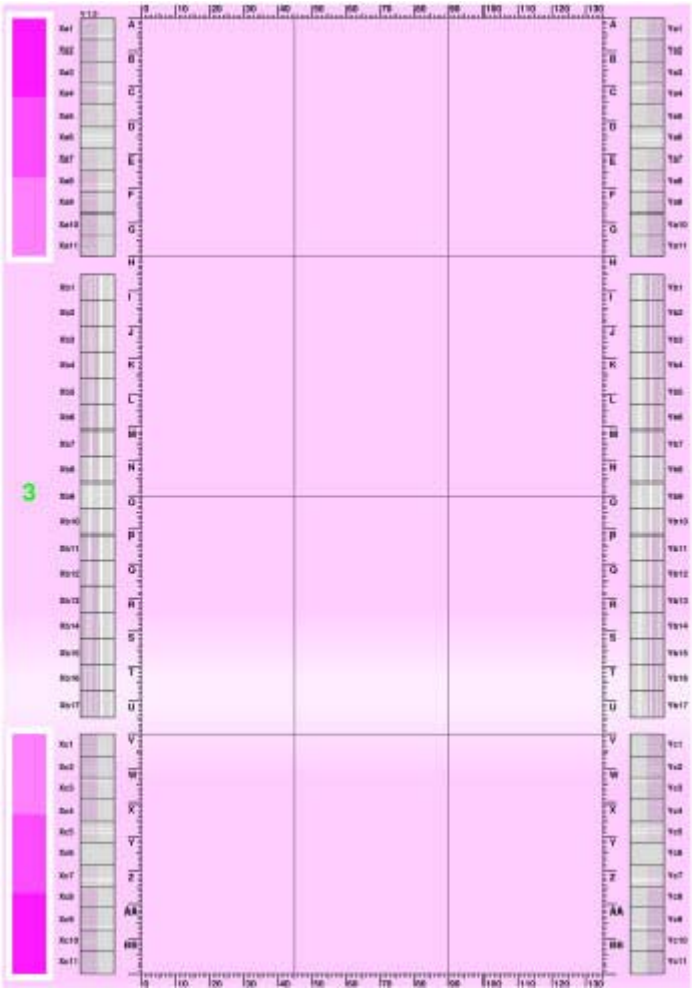
Wide horizontal streak

Frequency 1

Figure 6: Wide horizontal streak



Defect description

Wide horizontal streak appears parallel to the feed direction in one color only.

Possible causes

Contamination of the OPC, or a dirty post charger. If the streak is dark, and across all colors, the cleaning blade may have failed.

Troubleshooting and suggestions

1. Replace the image drum matching the color of the test page with the streak.
2. If the streak is dark and appears on all or several of the test pages, open the front doors of the printer, then lower and raise the large green ITB lever. Lower and raise the blue transfer cleaner located behind the toner collection bottle.
3. Clean the post charger. Post charger problems will generally appear on the black page.

top

Light marks (98 mm dot in single color)

Frequency 1

Figure 7: 98 mm dot

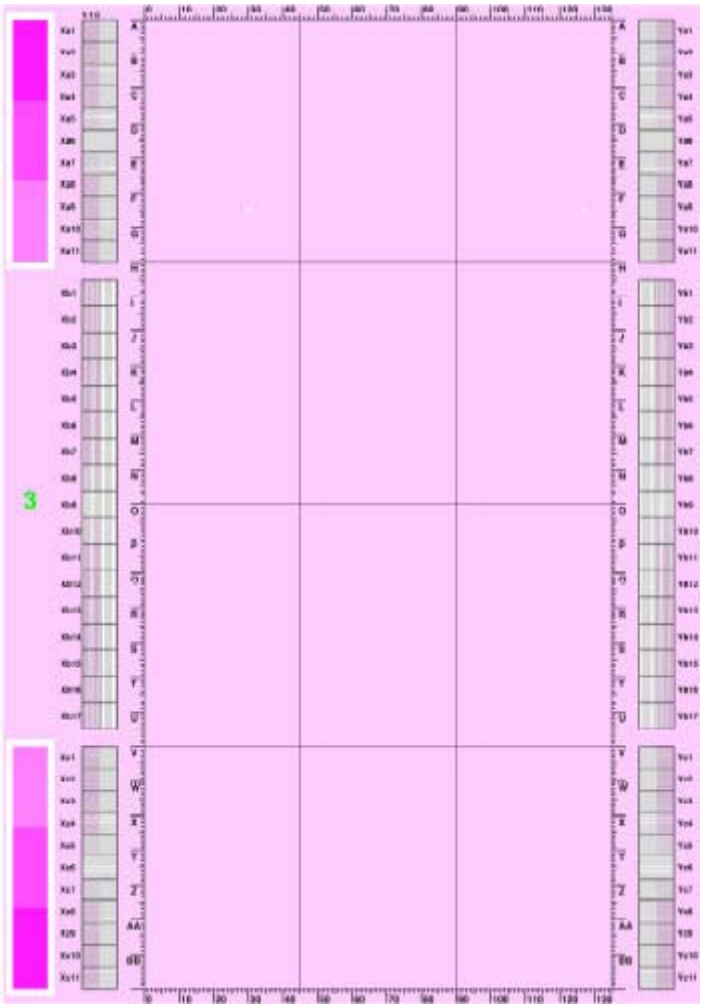
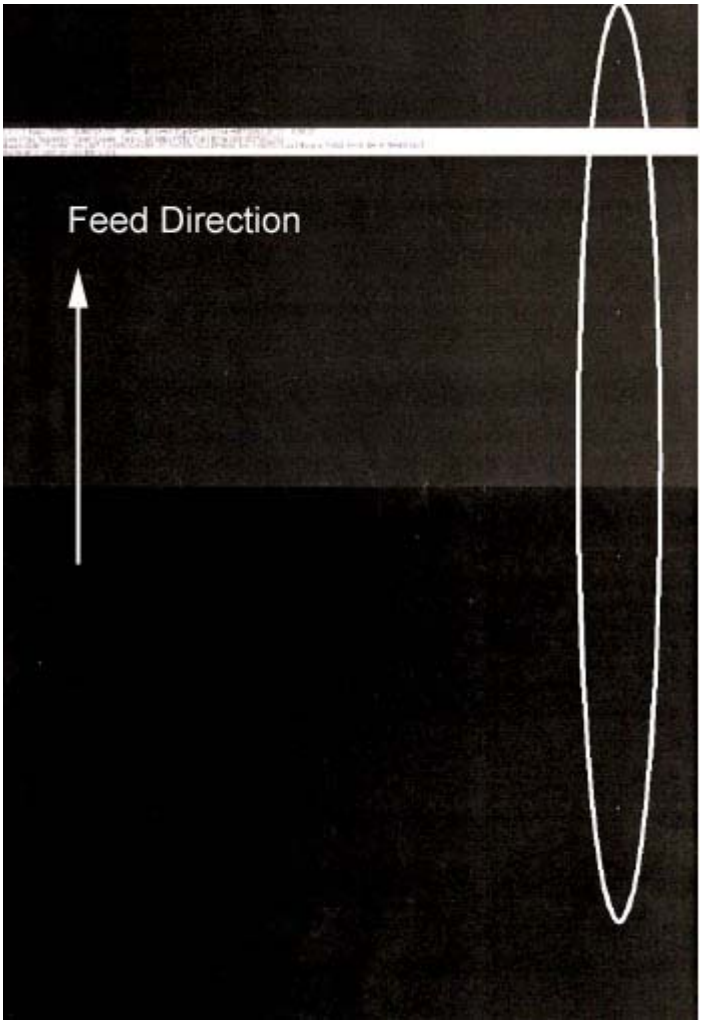


Figure 8: 98 mm dots



Defect description

Two or three light marks repeat every 98 mm in the feed direction on one color plane only.

Possible causes

Foreign substance stuck to the surface of the OPC.

Troubleshooting and suggestions

1. Run PQ assessment pages to isolate to a color plane.
2. Replace the image drum matching the color of the test page with the mark.
3. If the mark does not repeat regularly on the same page, there may be contamination on the ITB.

top

98 mm repeating marks of one color on all test pages

Frequency 1

Figure 9: 98 mm dots all test pages

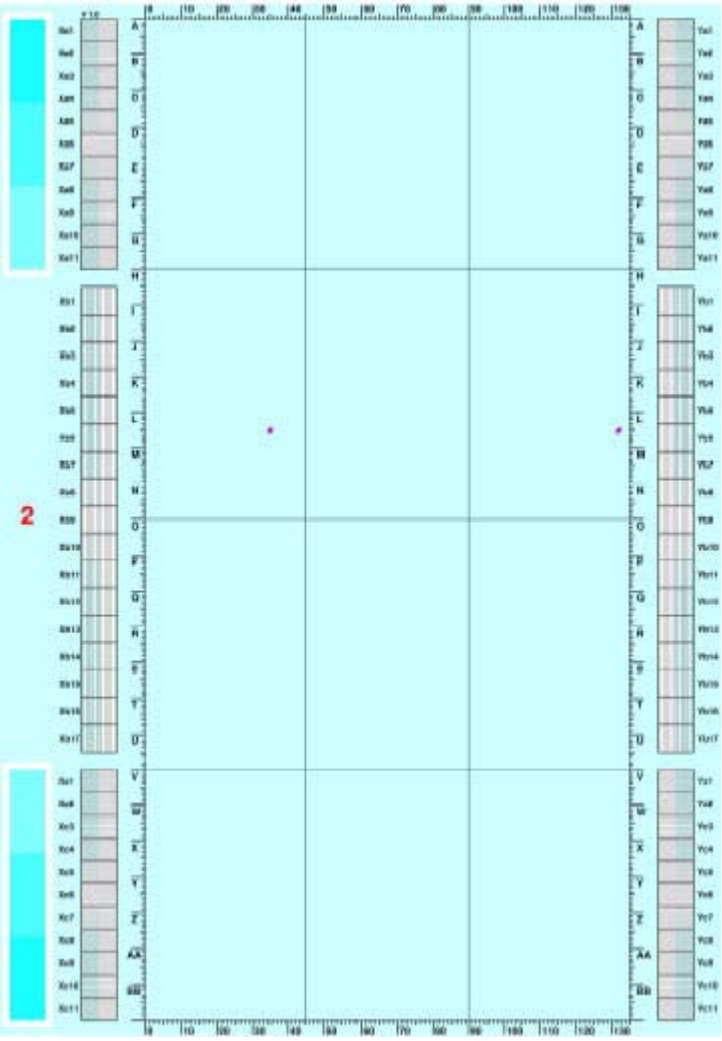
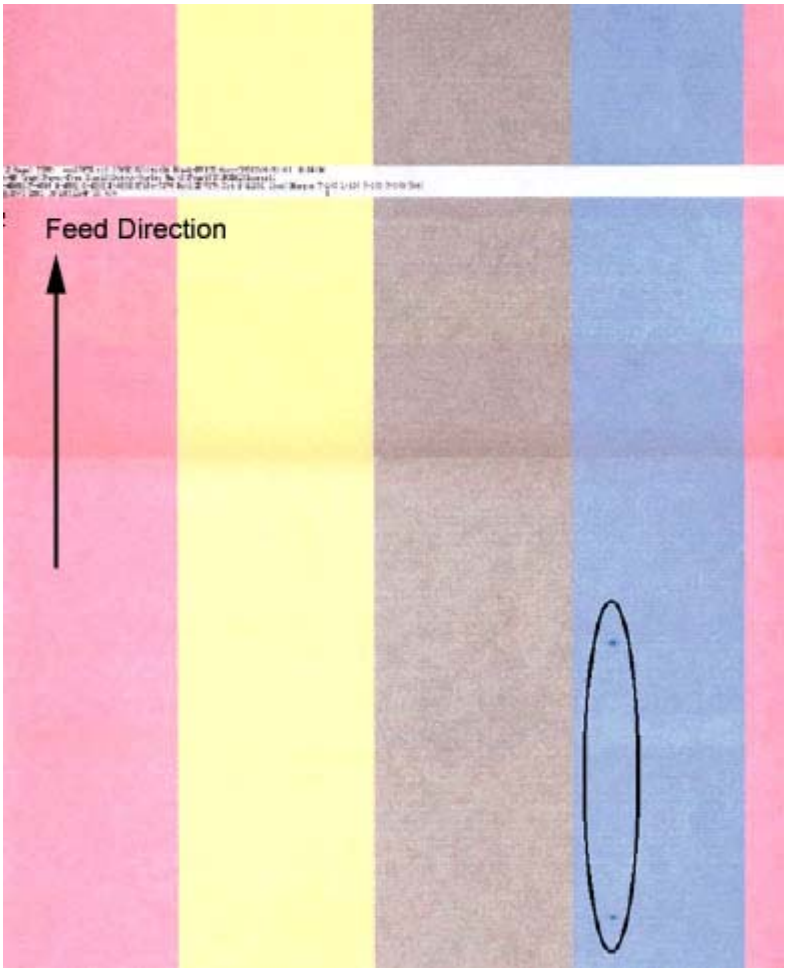


Figure 10: 98 mm dots on all test pages



Defect description

On all test pages, marks of a single color repeat every 98 mm at the same vertical location on each test page.

Possible causes

Small point of damage to the surface of the OPC.

Troubleshooting and suggestions

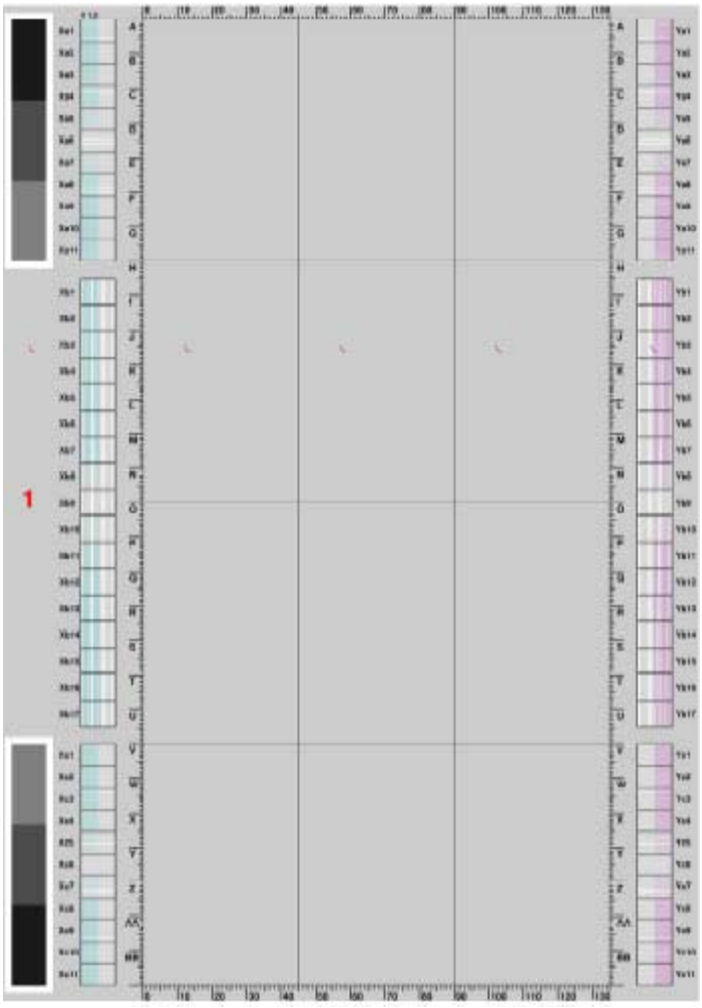
Replace the image drum matching the color of the marks, not the color of the page.

top

45 mm repeating marks of one color on all test pages

Frequency 1

Figure 11: 45 mm repeating marks on all test pages



Defect description

On all test pages, marks of a single color repeat every 45 mm in the feed direction on each test page.

Possible causes

Damage to the primary charging roller of the image drum matching the color of the marks.

Troubleshooting and suggestions

Replace the image drum matching the color of the marks, not the color of the page.

top

98 mm ghost (shadows of the test bars in the second column)

Frequency 1

Figure 12: 98 mm ghost

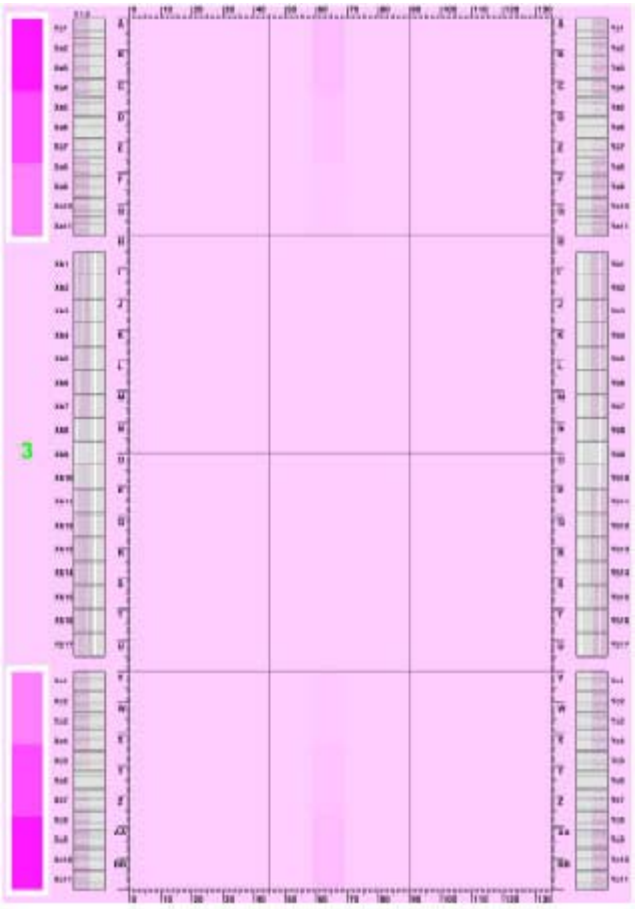
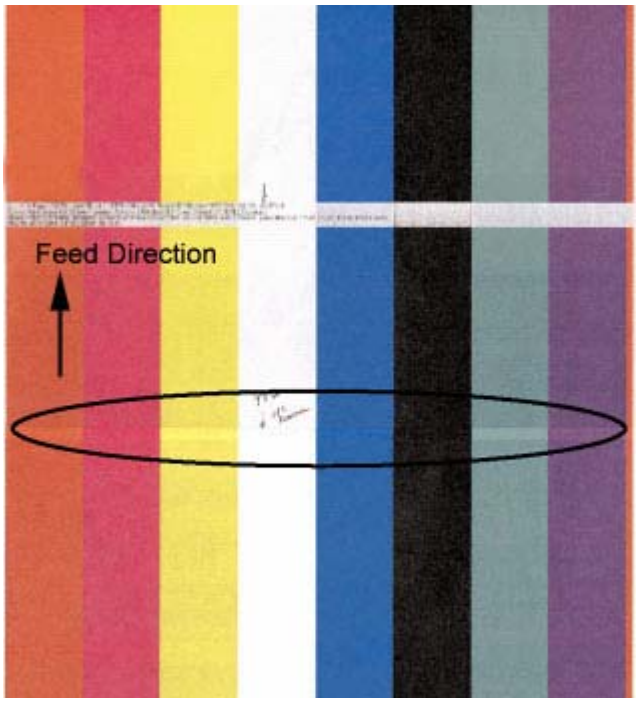


Figure 13: 98 mm ghost (shadows of the test bars in the second column)



Defect description

Dark image is ghosted into lighter areas at 98 mm. Also may occur that light solid fills may ghost into darker fill areas at 98 mm. May also be seen in single color planes. On one test page, shadows of the test bars appear in the second column (about 98 mm).

Possible causes

OPC ghost. Primarily seen with cyan and magenta, caused by incomplete cleaning of the OPC. Images are ghosted at 98mm (OPC frequency). This problem is very environmentally dependent and appears in high temperature, high humidity conditions.

Troubleshooting and suggestions

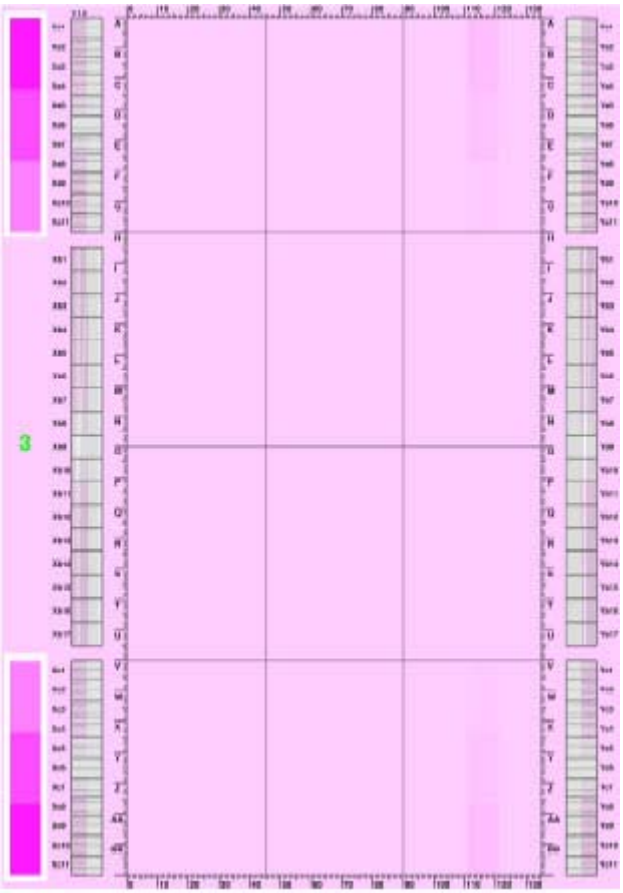
1. Run PQ Assessment pages to isolate to a color plane.
2. Reseat the image drum of the color(s) showing the fail, in the event that poor HV contacts to cleaning brushes are the cause of the problem.
3. Replace the image drum matching the color of the test page with the shadows.
4. As a workaround, customers may also be advised to change the layout of the page to place solid fills in an area where they will not ghost into light areas, reducing the chance of this ghost. Also, Letter and A4 paper can be fed in a rotated direction, which may reduce or eliminate the ghosted image.

top

140 mm ghost (shadows of the test bars in the third column on any test page)

Frequency 1

Figure 14: 140 mm ghost



Defect description

Dark image is ghosted into lighter areas at 140 mm. On any test page, shadows of the test bars appear in the third column.

Possible causes

Fuser ghost

Troubleshooting and suggestions

1. Check to see that the print mode set on the control panel and the paper type selected in the printer driver are correct for the media type.
2. Check to see that the media used is supported.
3. Replace the image fuser kit.

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ITB Cleaning blade not properly latched (can also cause 59.AO error) or nicked

Frequency 1

Figure 15: ITB Cleaning blade nicked or unlatched

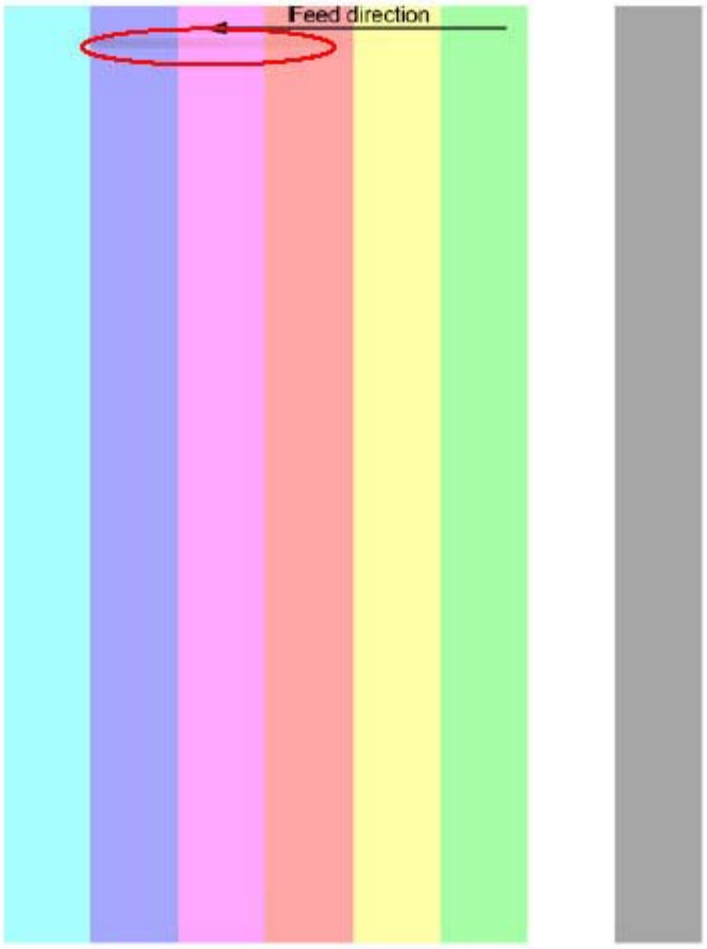

Figure 16: ITB Cleaning blade not properly latched

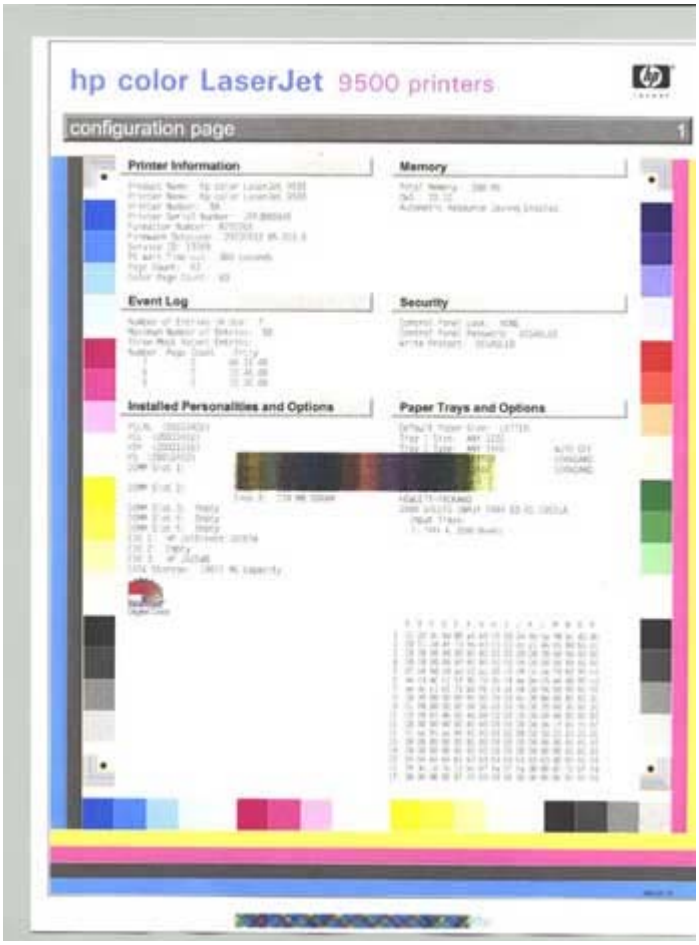

Figure 17: Another example of ITB cleaner not latched

Defect description

- Can appear as brown or dark streaks of toner in feed direction. May repeat, but not on every page (ITB variable frequency). Sometimes worse at start of job.
- Can appear as a faint ghost image or streaks across the whole page. If the printer calibrates, the calibration patches are apparent on printed pages as shown in the above examples.
- The two examples shown above have calibration marks that were not cleaned off due to the ITB cleaner not being latched properly.

Possible cause

The ITB cleaning blade is not latched completely. During installation of the printer, the customer may not understand how to fully latch the blade. Often customers will hold the blade's handle up and slide the toner collection bottle around it. This does not allow for complete latching of the blade against the ITB.

If the ITB cleaning blade is not latched properly it is possible for it to cause enough drag on the ITB to generate a 59.AO error (ITB motor error).

Troubleshooting and suggestions

1. Open the front left door.
2. Remove the toner collection bottle without moving the handle. If the blade is not latched correctly, it will fall slightly when the bottle is removed. Check for this movement to determine if the blade was latched correctly.
3. Lower the blade, remove and reinstall it in the printer.
4. To correctly latch the blade in place, lift the blade up with your right hand and then push it to the right with your left hand. When installed correctly:
    a. The blade should make a click sound when it is installed
    b. The blue handle on the blade will be parallel with the blue handles for the print cartridges (t-carts).
    c. The toner collection bottle will fit over the blade's blue handle without holding the blade in place.
5. Reinstall the toner collection bottle and shut the printer's front door.
6. Print the PQ Troubleshooting pages to verify the issue is resolved. It may take several pages to clean the ITB before the images printed are clear.

CAUTION:

Do Not replace the ITB assembly.

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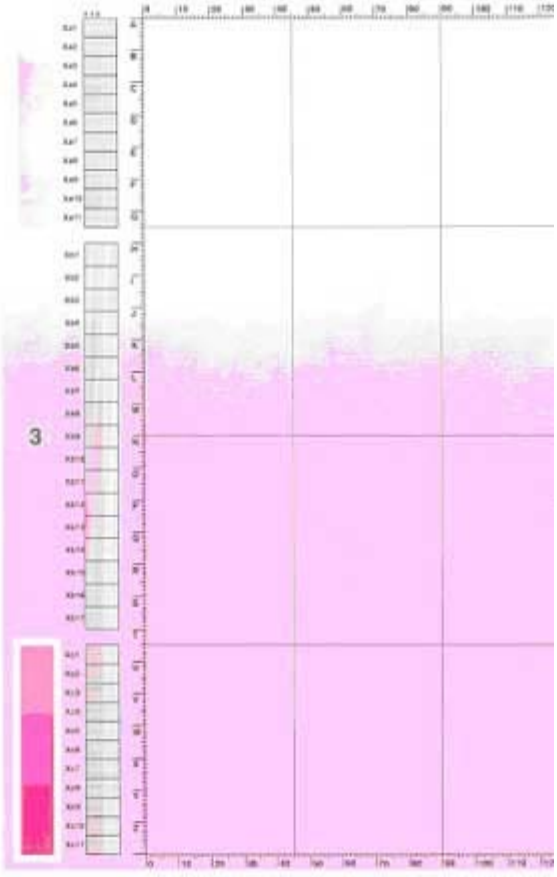
Color plane fades in scan direction

Frequency 1

Figure 18: Example of faded color plane in scan direction



Defect description

Color plane fades in scan direction (bottom to top of letter/A4 page or front to back of printer). The color plane may be faded only on the top 1/3 of the page as the example shows, or it may be faded over most of the page.

Possible causes

The spring holding the T1 roller on the ITB for the color plane that is faded has come loose or fallen out completely. The black bushing holding the T1 roller may also have broken.

Troubleshooting and suggestions

1. Print the PQ Troubleshooting pages to verify which color plane is faded
2. Check the ITB for a missing T1 roller spring - Remove the ITB and identify the T1 rollers inside the ITB. They are held in place by white bushings on one end and black bushings on the other. These bushings have springs underneath them, creating tension on the T1 roller. Check for the springs under the T1 roller for the color plane that is faded, especially under the black bushings.
3. If the spring is missing, replace the ITB. Check for the spring inside the printer. It will most likely fall into Tray 2.
4. If the spring is not missing and all T1 rollers have the same tension, replace the image drum for the color plane that is faded.

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Roller marks on glossy or plastic media such as HP Tough Paper

Frequency 1

Defect description

Post-fuser rollers cause one of two defects - different gloss level stripes in the feed direction and wavy media.

Possible causes

1. Roller pressure causes post-fused toner to show different gloss levels (mostly fixed with continuous rollers).
2. Continuous rollers cause still-warm media to be wavy.

Troubleshooting and suggestions

Use straight-through paper path to avoid as many post-fuser rollers as possible. Manual duplex.

> **NOTE:**
>
> Onsite visits and parts replacement (such as printer parts or consumables) will do nothing to alleviate roller marks. Do not dispatch onsite service or parts for this defect.

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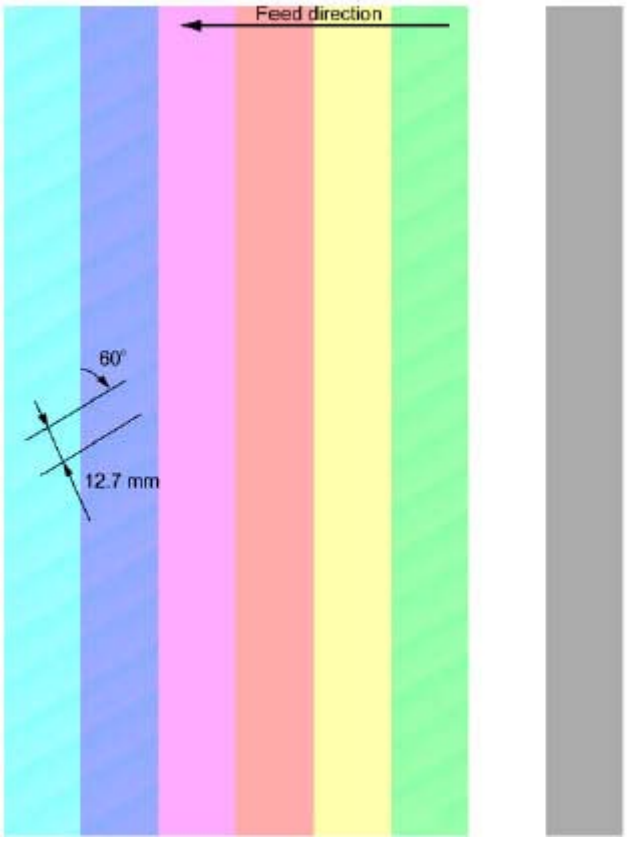
Auger marks

Frequency 2

Figure 19: Auger marks



Defect description

Diagonal banding or an angled plaid-appearing density variation (50 degree angle, about 15mm repeat, difficult to measure). This sample is in cyan, but can happen in any color (CMYK). May be a temporary problem.

Possible causes

Will appear in solid or heavy color fill pages printed in very large quantity. Often high coverage causes subsequent pages to have auger marks. Auger marks are a failure to charge the toner evenly. Often this is due to worn-out carrier (very old image drum). Replacing the Image Drum will use new carrier. Also, possibly caused by image drum that was removed and turned upside down, then reinstalled in the printer.

Troubleshooting and suggestions

1. Run a few pages (PQ Assessment pages, for example) and the problem may clear up.
2. Run PQ assessment pages to isolate to a color plane.
3. Replace the image drum of the process color showing the defect.

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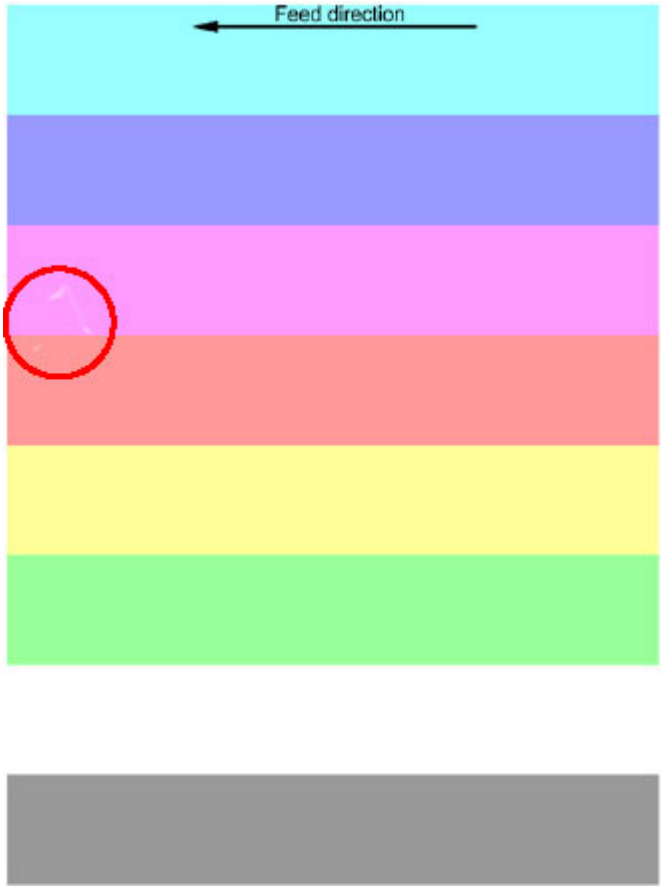
Random light or dark spots (ITB damage)

Frequency 2

Figure 20: ITB damage



Defect description

Spot of any size or shape of missing (white) or too much (dark) toner. Will repeat, but not on every page (ITB variable frequency). The defect itself will repeat in terms of size, shape, and location with regard to feed direction.

Possible causes

Physical damage to the ITB (such as creases, dents, holes, or deep scratches) or contaminant stuck to the ITB.

Troubleshooting and suggestions

1. Eliminate the possibility of a higher frequency repeat by printing the PQ assessment pages.
2. If the defect is caused by a finger or hand print on the ITB, the cleaning blade will solve the problem after 10 to 50 pages of printing.
3. If the repeat is still irregular, lower the green handle and partially remove the ITB, turn the flywheel on the right side of the assembly to inspect the entire belt for physical damage or contaminant.
4. Gently remove contaminant using the edge of a smooth-sided coin.
5. If contaminant cannot be removed, replace the ITB.

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Rib marks/discharge marks

Frequency 2

Figure 21: Rib marks

Defect description

Straight lines of toner in feed direction that are moved prior to fusing due to discharge or physical collision with sensor flags, paper path guides, or ribs. Defect may fade in and out in the direction of paper feed, but will always be in the same position perpendicular to the paper feed direction. Most common with smooth gloss film media, and HP Tough Paper (plastic media), solid dark color fills.

Possible causes

Pre-fused toner being moved prior to fusing due to discharge or physical collision with guides or ribs.

The discharge comb of the secondary transfer roller area, over time, may accumulate enough toner and paper dust to cause horizontal lines, smeared toner, and white areas.

This failure is post T1, and therefore can occur in one or all color planes. The problem is seen primarily on glossy or rough media, in high temperature/high humidity or low temperature/low humidity conditions. Commonly seen on second side, but occasionally on first side, and will look like white process feed direction marks, such as streaks, worms, circles, and lightning strikes.

Troubleshooting and suggestions

1. Clean fuser inlet with supplied brush as documented in User Reference Guide.
2. Inspect fuser entrance guide ribs and fuser sensor flag, for accumulated toner or foreign object hanging onto paper path.
3. Replace fuser unit.

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Wavy brush marks / background color on printouts

Frequency 2

Figure 22: Wavy brush pattern

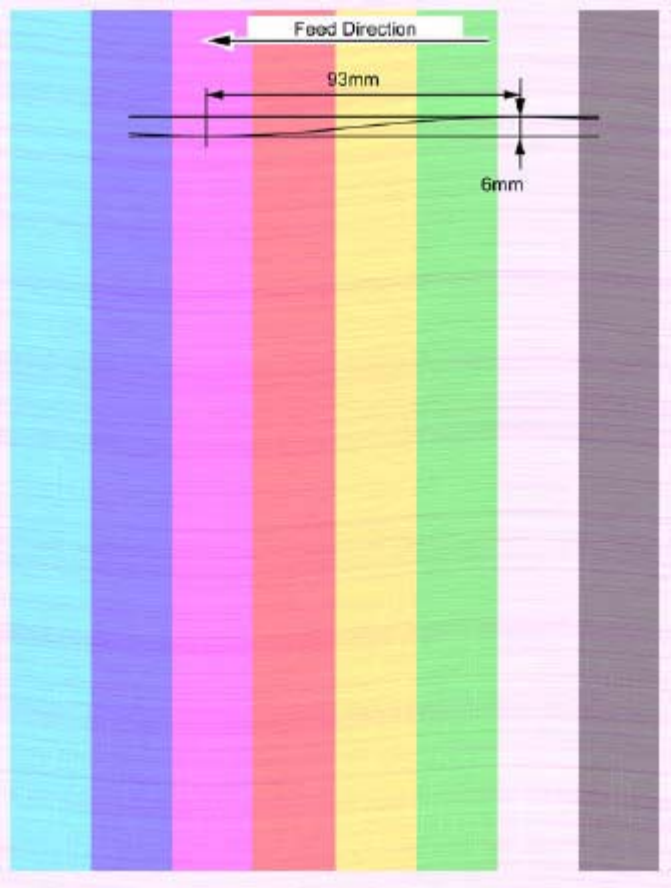
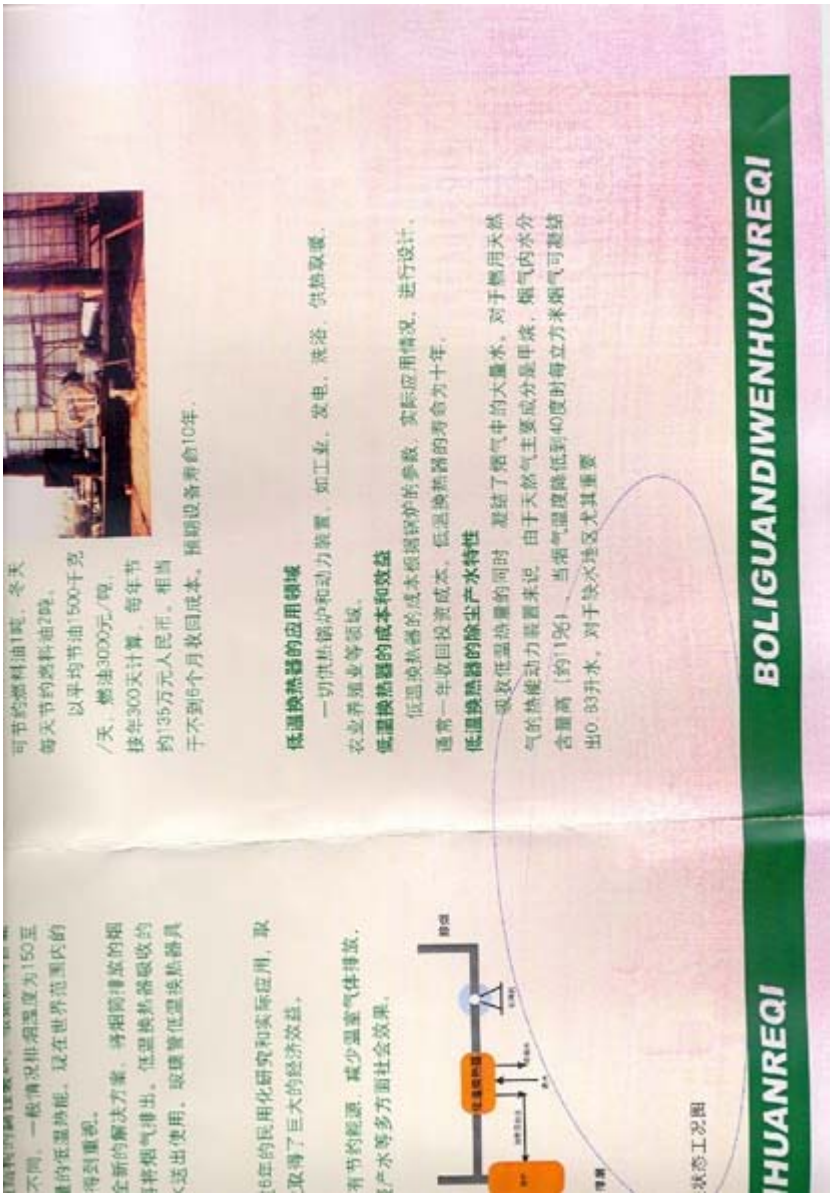


Figure 23: Magenta background along with repeating primary charge roller dunes

Figure 24: Magenta background

Figure 25: Magenta background and brush marks (wavy lines)



Defect description

Wavy brush patterns of a single primary color covering the whole page, including the unprintable region. This may also be seen as a background haze in one primary color as the wavy pattern may not be apparent.

Possible causes

Image drum cleaning brush failure due to bad connection or toner overload. This is more likely to occur when the customer prints intermittent heavy coverage, followed by low coverage documents.

Troubleshooting and suggestions

1. Print a PQ Assessment set to isolate to a particular color plane - in this case, magenta.
2. Reseat the image drum matching the wavy brush pattern color.
3. Check high voltage supply and connections to the image drum.

4. Replace the image drum matching the wavy brush pattern color.

NOTE:

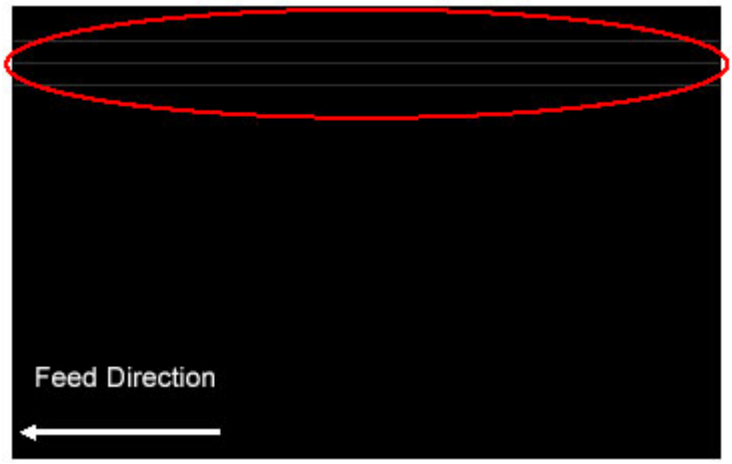
An improvment was made in print cartridges manifactured after early March 2004. Print cartridges with date code 4C03XX or later are less likely to exhibit this defect.

top

Scratches

Frequency 2

Figure 26: Scratches



Defect description

Very fine, straight razor-like scratches in the feed direction (lines of missing toner). Most common with smooth gloss film media, and HP Tough Paper (plastic media), solid dark color fills, heavy coverage. Most visible in high gloss situations.

Possible causes

Post-fused toner that is not completely cooled being scratched due to physical collision with guides or ribs (duplex diverter, guide to face down tray). This defect will be most common on duplexed output as the marks are caused by the diverter that sends the page to the duplexer and the guide to the face-up tray. The defect will show on the second side, which is the first side to be printed. This defect will show up most in output with dark solid fills from PowerPoint or similar presentation applications. This defect will appear on transparencies, but the defect does not show up when projected on a screen.

Troubleshooting and suggestions

1. Ensure printer mode settings are correct for the plastic high gloss media - this turns on the cooling fan in the paper path that will cool the newly fused toner faster and lessen the effect of the rib guides.
2. Do not use a straight-through paper path. Pages that are fed to the top (face down) output

tray avoid the ribs of the diverter.
3. Do not duplex if possible. Manual duplex is an option.
4. Use different media.

NOTE:

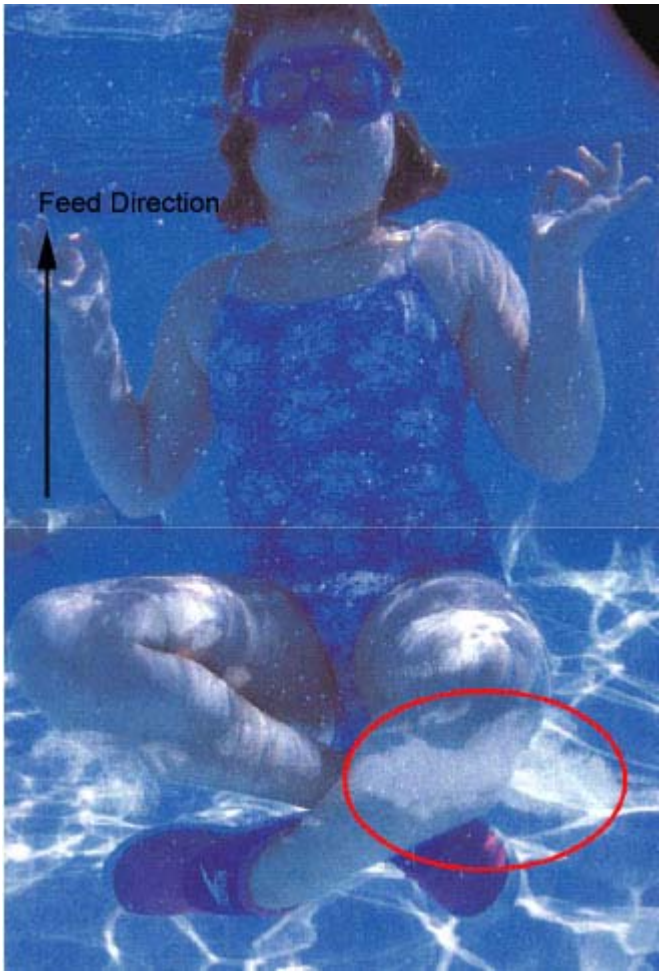
Onsite visits and parts replacement (such as printer parts or consumables) will do nothing to alleviate scratches. Do not dispatch onsite service or parts for this defect.

top

Hand print on ITB

Frequency 2

Figure 27: ITB hand print



Defect description

Very clear finger and handprints appear on the printed page.

Possible causes

Finger and handprints on the ITB (from installation, jam clearing).

Troubleshooting and suggestions

As bad as this defect appears, it usually clears up in a matter of a few pages due to the cleaning blade.

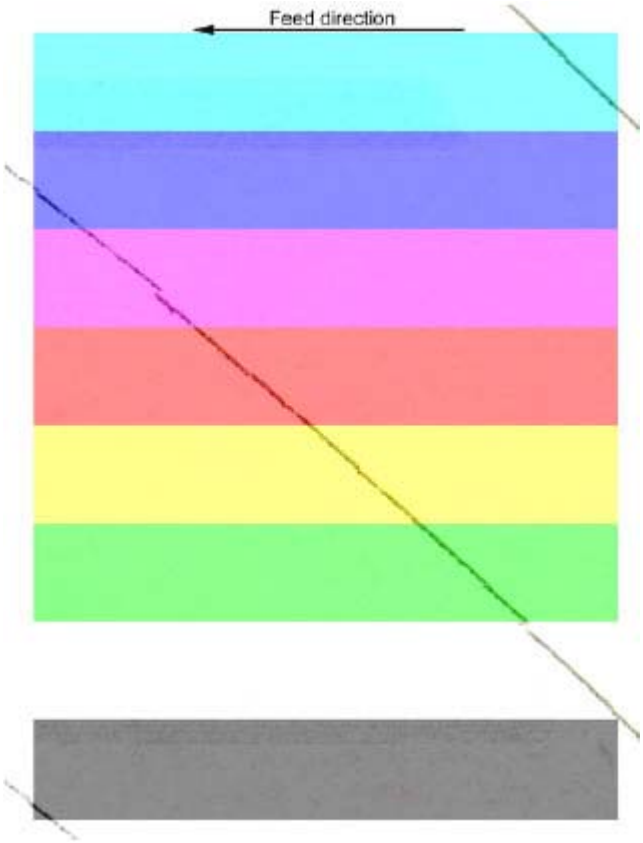
Advise the customer to print 10 to 15 pages on lower-cost paper and then to avoid touching the belt in the future.

top

Cleaning blade tuck (cleaning blade failures)

Frequency 3

Figure 28: Cleaning blade tuck



Defect description

Pages are marked with diagonal lines of smudged toner deposits (large angled / or \ or in a V-shape). Lines or smudges usually contain all toners and show up as a muddy brown color, but may be the most commonly used toners.

Possible causes

Cleaning blade- or ITB that has been used considerably past life recommendations. Cleaning Blade is bent into a backward "J" shape as the ITB runs underneath it. Creates enough drag to possibly cause a Registration Roller Motor, or ITB Motor Abnormal Error. (Also, see 59.A0 notes in service manual.) Blade tucks seem to be more common when image drums, cleaning blade and ITB are all new. Also, more common at 30C/80% Relative Humidity (high temperature/high humidity). Some blade tuck events cause a 59.A0 error before a page is printed. In this case check the image on the ITB.

Troubleshooting and suggestions

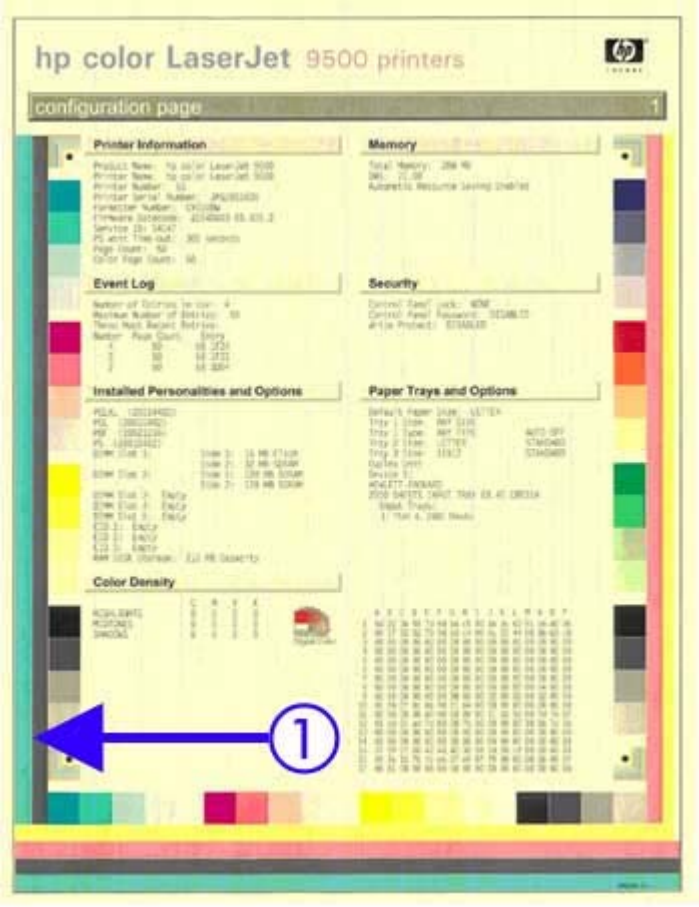
1. Re-seat cleaning blade assembly and ITB. Make sure the green level is all the way in the "up" position.
2. Replace cleaning blade assembly.
3. Replace ITB if necessary (usually not damaged).

top

Yellow development accross the page

Frequency 3

Figure 29: Yellow development accross the page



1 - Feed direction of paper thriogh printer

Defect description

Heavy yellow development covering the entire printable area. The intended image is also on developed on the page. The yellow does not extend into the unprintable region, unlike Wavy Brush Patterns.

Possible causes

The formatter is providing an incorrect signal to the DC Controller. This issue has been identified, but root cause is unknown at this time.

Troubleshooting and suggestions

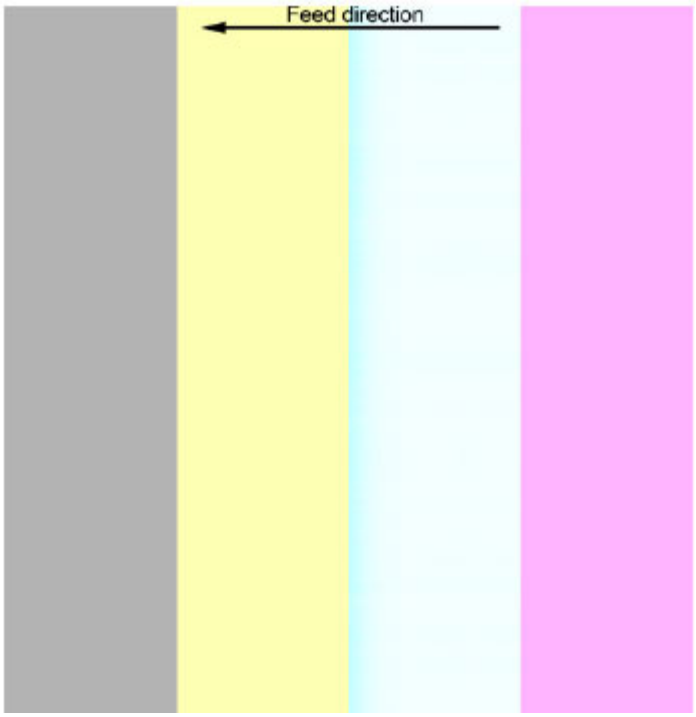
1. Print an Engine Test. Note: If the formatter is installed, a 49 error will follow the engine test print. See the Service Manual for instructions in order to print an engine test with the formatter removed.
2. If the engine test prints correctly, replace the formatter.
3. If the engine test does not print correctly, check the high voltage supply and connections to the yellow image drum.

top

Dropped or missing color planes

Frequency 3

Figure 30: Dropped or missing color planes



Defect description

One or more color planes drop out or fade out. In the scan direction, the color plane should be consistent (either missing or present). In the feed direction, the color planes are intermittent or missing.

Possible causes

Typically, not the process cartridge, but rather a stall of the developer motor on OPC due to electrical noise in the system. Connector problems to the motor (post charger, ribbon cable, HV contacts, DC controller)

Troubleshooting and suggestions

1. Reseat image drum cartridges, and image transfer belt to ensure HV connections.
2. Inspect ITB for good HV connections to the T1 rollers. Check HV paths and motor control/drive paths from image drum drive assembly and ITB to HV-PS and to DC controller.
3. Replace image drum for missing color.
4. Replace ITB.
5. Check/replace laser scanner for missing color.
6. Check/replace HV power supply, DC controller.

NOTE:

Do not forget to force Calibrate Now (Configure Device Print Quality Calibrate Now) in case calibration data has been saved under the broken condition.

top

Completely missing color plane

Frequency 3

Defect description

The printer prints with one color plane completely missing (for example, Cyan).

Possible causes

- Find out if either of the print cartridge or image drum of the color plane in question have recently been replaced.
- If so, check, and reseat those parts.
- Then, make sure toner is feeding from the print cartridge to the image drum (look for visible signs of toner moving between the two, and see that the shutter doors are functioning correctly).
- Check to see that the toner dam and all shipping protection have been successfully removed from both the print cartridge and the image drum.

Troubleshooting and suggestions

Inspect and test these areas. Replace parts as necessary.

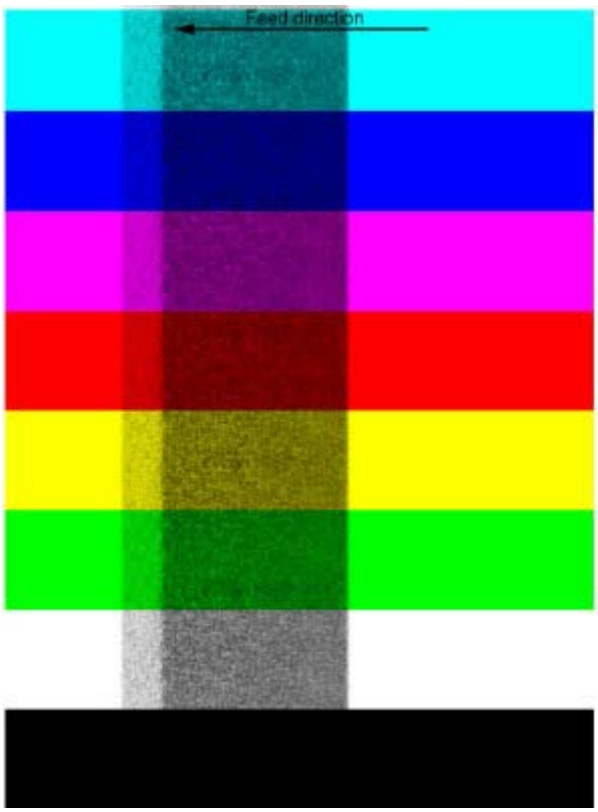
1. ITB parts for the color plane in question (copper contacts for primary transfer bias, springs that position primary transfer roller, etc.). Trace these leads backward to the HV power supply.
2. High voltage paths and connectors to print cartridge for opens (intermittent or poor connections usually don't result in a complete dropout). Trace backward to the HV power supply.
3. High voltage paths and connectors to ITB (primary transfer) for opens (intermittent or poor connections usually do not result in a complete dropout).
4. Print cartridge and image drum (such as connectors and doors)
5. DC controller
6. HV power supply

top

Cleaning Blade ghost (cleaning blade failure)

Frequency 3

Figure 31: Cleaning blade failure



Defect description

Ghost of previous image (K toner over color bands) may be all colors, or predominant color printed.

Possible causes

Cleaning blade not latched

Troubleshooting and suggestions

Reseat and latch the cleaning blade assembly. Note: The toner collection bottle may interfere, so that a mislatch may not be obvious. Remember to execute a Calibrate Now from the control panel as bad calibrations may have occurred while the cleaning blade was not functional, causing the printer to be working with bad calibration data. This would cause light output.

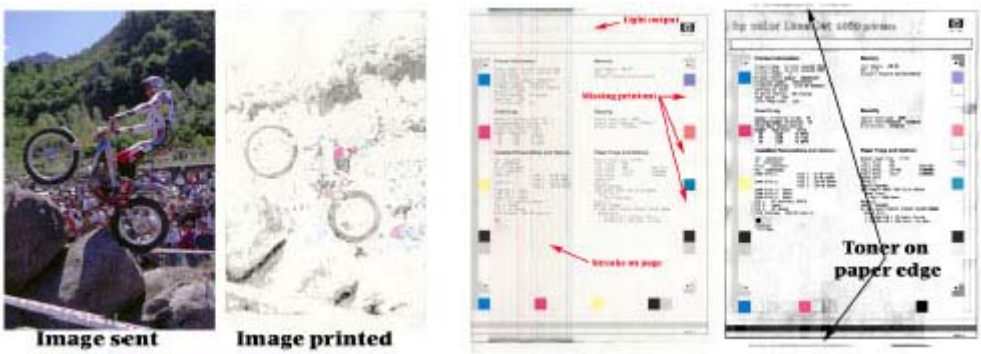
> **NOTE:**
>
> Severe cleaning blade failures (extensive, and left to run in bad condition for many pages) can cause damage to the OPCs of the image drum cartridges, particularly yellow. In cases of severe cleaning blade failure, the image drums should also be checked for damage once the blade fail is corrected. Replace damaged image drum(s).

top

Washed out or missing color, toner on edges of paper due to cleaning blade failure

Frequency 3

Figure 32: Cleaning blade failure



Defect description

Pages print with washed-out or missing halftones. Some pages may have toner streaking across the pages.

Possible causes

A density calibration has taken place while the printer was experiencing a cleaning blade failure.

Troubleshooting and suggestions

1. Correct the cleaning blade failure, by reseating or replacing the cleaning blade.

NOTE:

The toner collection bottle may interfere, so that a mislatch may not be obvious.

2. After the cleaning blade failure is corrected, execute a "calibrate now" from the control panel to correct the light output caused by miscalibration.

NOTE:

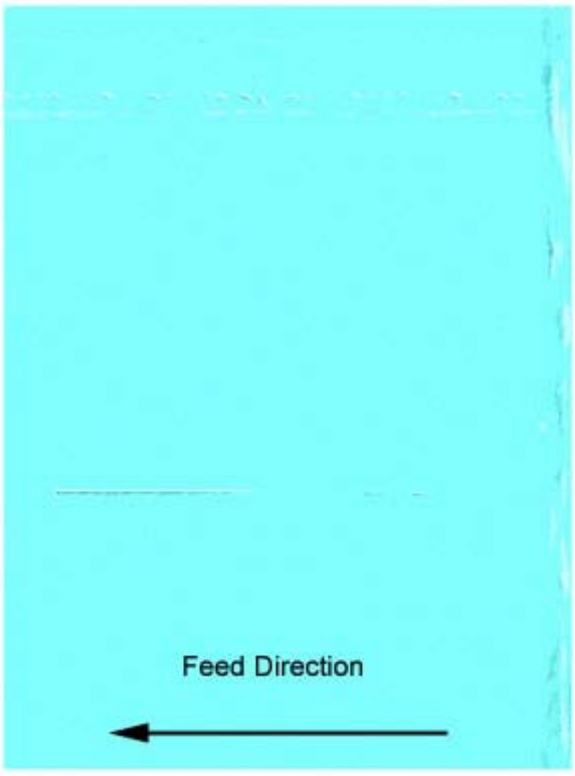
Countermeasures were implemented prior to introduction that greatly reduce the possibility of the cleaning blade becoming unlatched.

top

Discharge marks

Frequency 3

Figure 33: Discharge marks



Defect description

White marks generally in the feed direction, or on the leading/trailing edges of the paper that can be straight lines, circles, worm shaped, or look like lightning strikes.

Possible causes

Toner and paper dust build up on discharge comb near T2, which causes the charge on the paper to be dissipated unevenly. Usually only seen late in printer life after much use.

Most common with thin rough medias. Some coated medias are very resistive and can cause this defect also.

Troubleshooting and suggestions

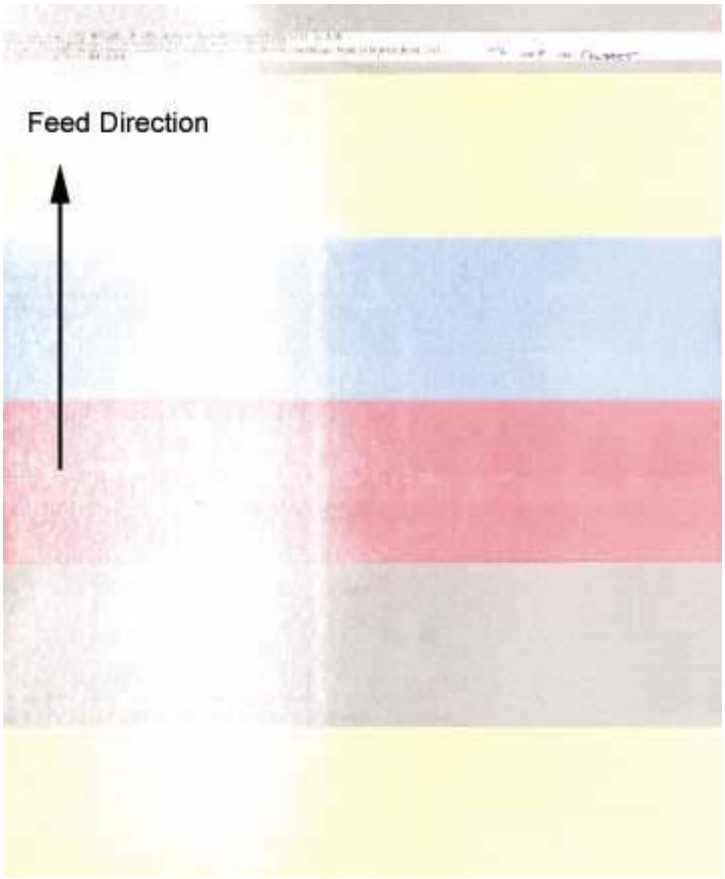
1. Use the cleaning brush (attach brush to tongs) to knock the toner and dust off the comb. Customers may lose or misplace the brush. In this case, they can use a toothbrush or anything similar that may be available. See User Reference Guide about how to clean the comb with the included cleaning brush.
2. Also, make sure customers are using recommended media and using the appropriate TYPE setting on the control panel to match the media. This implements the best secondary transfer settings that will avoid these discharge marks. If a glossy media is being used, try using HP High Gloss Paper.
3. Leave media wrapped until it is used. Do not store media in printer tray for long periods of time.
4. Use a different media.

top

T2 not in contact

Frequency 3

Figure 34: T2 not in contact



Defect description

Poor secondary transfer across all color planes.

Possible causes

Poor transfer caused by T2 roller not contacting the ITB. ITB or T2 roller is not correctly seated, or ITB lever is not in full up position, causing uneven T2 pressure. May also be caused by a lack of T2 bias. Note that defect crosses all color planes indicating the problem is likely related to secondary transfer and not primary transfer.

Troubleshooting and suggestions

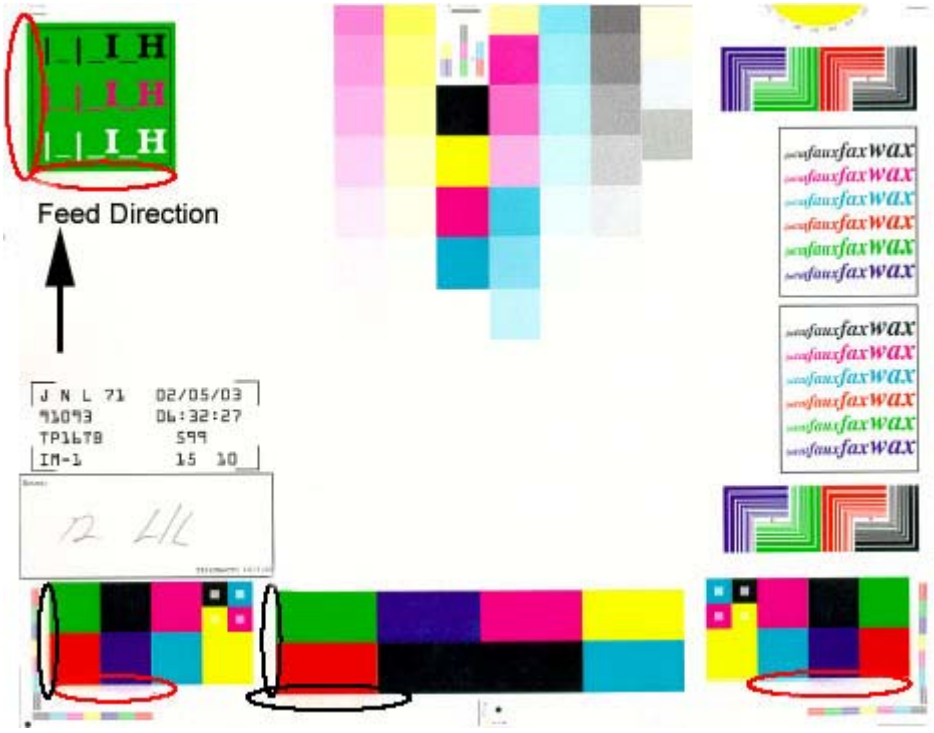
1. Reseat the ITB and be sure the green lever is fully raised.
2. Inspect the secondary transfer roller for correct seating and any binding of its vertical movement.
3. Reseat and latch the cleaning blade assembly. The toner collection bottle might interfere, so a mislatch may not be obvious.

top

Toner explosion

Frequency 3

Figure 35: Toner explosions



Defect description

Toner halos form in the white areas around solid, heavy coverage, secondary color fills. May appear on the second side (page 1) of a duplexed page. Note the areas in the sample around the red, green, and process blue boxes. Usually in cases of very low humidity.

Possible causes

Toner moves away from the solid fill at the time of secondary transfer.

Troubleshooting and suggestions

1. Check to see that media is within specification.
2. Check for correct media type settings on the control panel menu.
3. Keep media wrapped until use.
4. Choose colors that are lower coverage (lighter and closer to primary). User may try different settings under print quality optimize transfer (down or up depending on the media). Some testing may be necessary to find the optimal setting.

NOTE:

Onsite visits and parts replacement (such as printer parts and consumables) will do nothing to alleviate toner explosions. Do not dispatch onsite service or parts for this defect.

top

Oil stains and cooling marks

Frequency 3

Defect description

Oily looking stains that appear as different levels of gloss.

Possible causes

Caused by variations in cooling as the page proceeds from the fuser up to the top output tray. Most common with smooth gloss film media and HP Tough Paper (plastic media), and solid dark color fills. The higher the gloss level, the more visible this becomes. Occurs only when the page is fed to the face down, top output tray.

This will be most common in output with dark solid fills from PowerPoint or similar presentation applications. This defect will appear on transparencies, but the defect does not show up when projected on a screen.

Troubleshooting and suggestions

1. Ensure printer mode settings are correct for the plastic high gloss media - this turns on the cooling fan in the paper path between the fuser and the top output bin.
2. Use a straight-through paper path, allowing more rapid and even cooling when using gloss film or HP Tough Paper (plastic media).
3. Use different media.

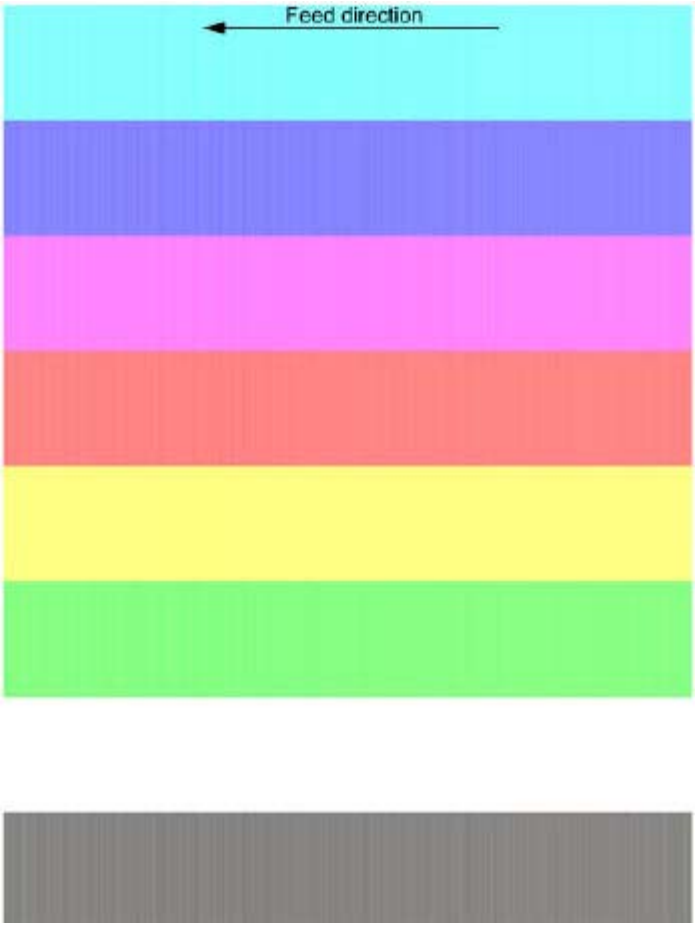
> **NOTE:**
>
> Onsite visits and parts replacement (such as printer parts and consumables) will do nothing to alleviate cooling marks. Do not dispatch onsite service or parts for this defect.

top

Fine pitch banding

Frequency 4

Figure 36: Fine pitch banding



Defect description

Fine pitch banding. Shows up across all color planes (CMYK output). Electrical banding is usually irregular pitch (as opposed to mechanical banding).

Possible causes

Electrical banding from T1 cross-talk

Troubleshooting and suggestions

1. Reseat image drum cartridges and ITB to ensure good high-voltage contacts.
2. Check all high-voltage paths from ground back to high voltage power supply.
3. Check connections and common ground on the ITB.
4. ITB may be past life; replace if necessary.

top

Ring Marks

Frequency 4

Figure 37: Examples (1 of 3) of Ring Marks

Figure 38: Examples (2 of 3) of Ring Marks

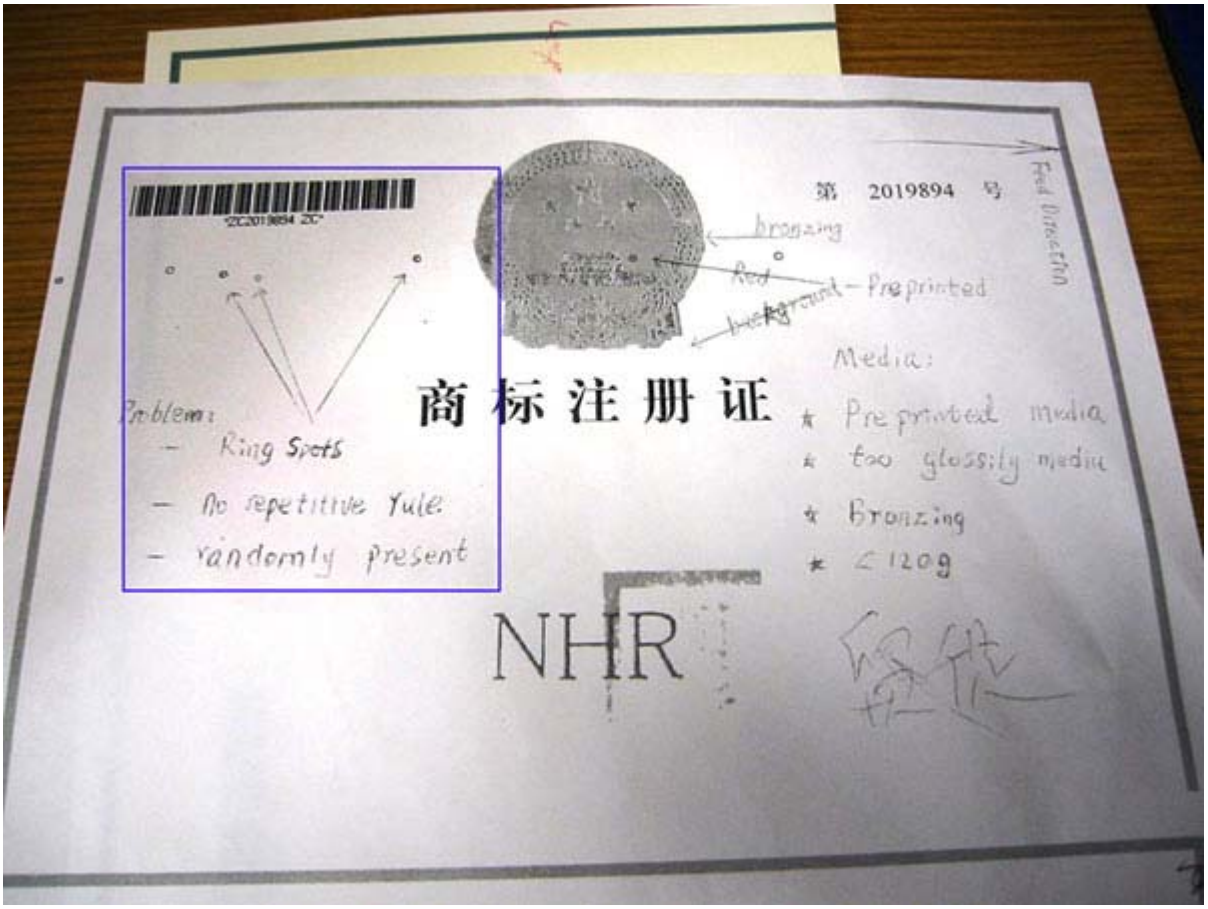


Figure 39: Examples (3 of 3) of Ring Marks

Defect description

Small, random circles on the page. May be only one ring mark on the page, or multiple

Possible Cause

Foreign particle residing in the image drum. An occasional ring mark occurring from time to time is normal. Frequent ring marks may occur if the engine is opened up frequently.

Troubleshooting and suggestions

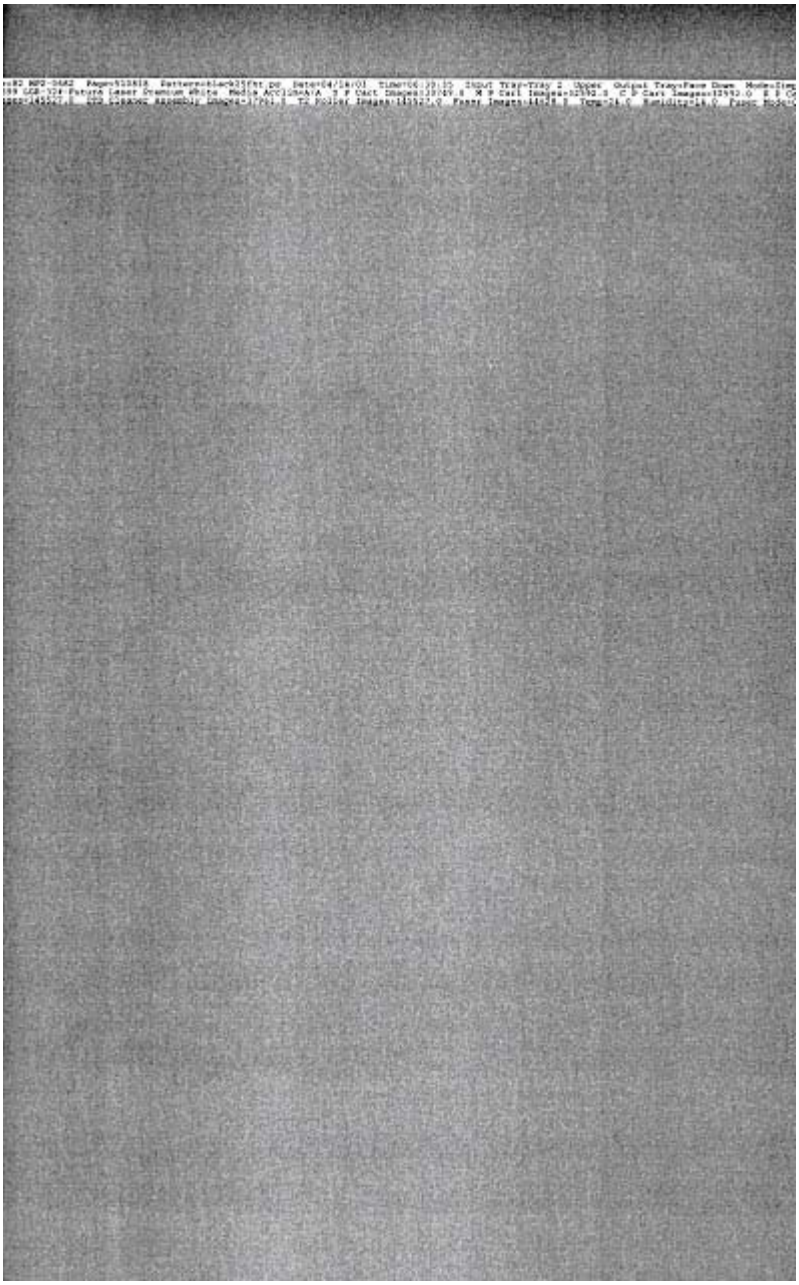
Occasional ring marks are to be expected. Only if the ring marks occur frequently in one color, replace the image drum.

top

OPC surface contamination

Frequency 4

Figure 40: OPC surface contamination



Defect description

Wide fade or light area image defects that run in the feed direction or a mottled density loss in a single color.

Possible causes

Silicate or carrier contamination on the surface of the OPC causes poor laser discharge and subsequent poor toner transfer. Tends to occur in environments with high temperature, high humidity, and low coverage at the end of image drum life. Usually happens with high volumes of solid fills followed by a halftone fill.

Troubleshooting and suggestions

1. Run PQ Assessment pages to verify affected color.
2. Replace the image drum of the color showing the defect, which in this case is black.

NOTE:

Internal HP note: The OPC surface may be inspected for contamination or damage. The contamination may be visible or felt on the surface of the OPC. An OPC can be cleaned with a soft tissue in an emergency situation only (the OPC is difficult to turn).

top

Fuser flats

Frequency 4

Figure 41: Fuser Flats (1 of 3)

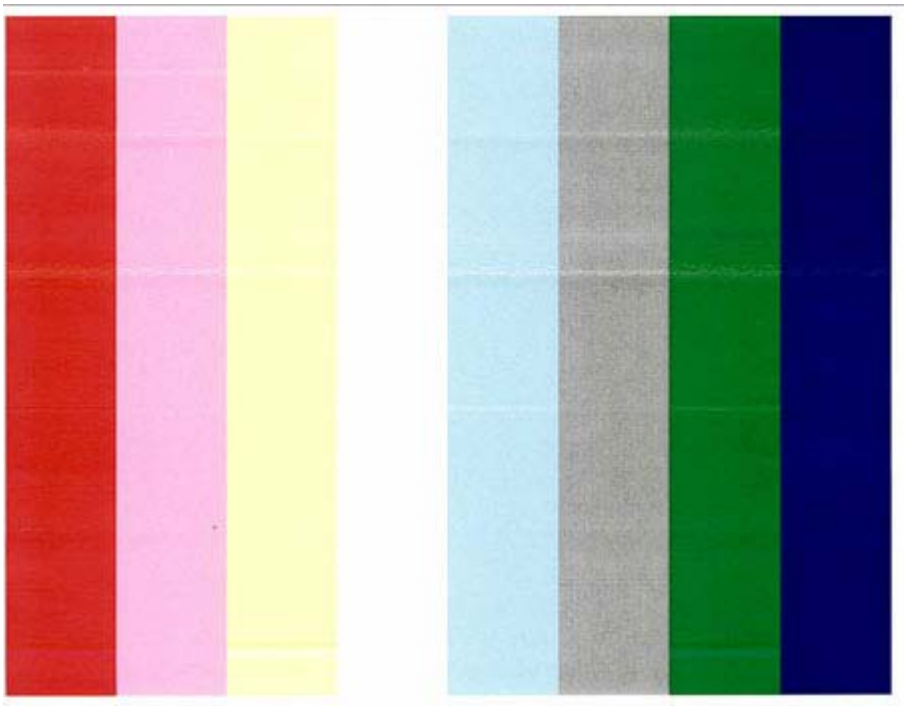


Figure 42: Fuser Flats (2 of 3)

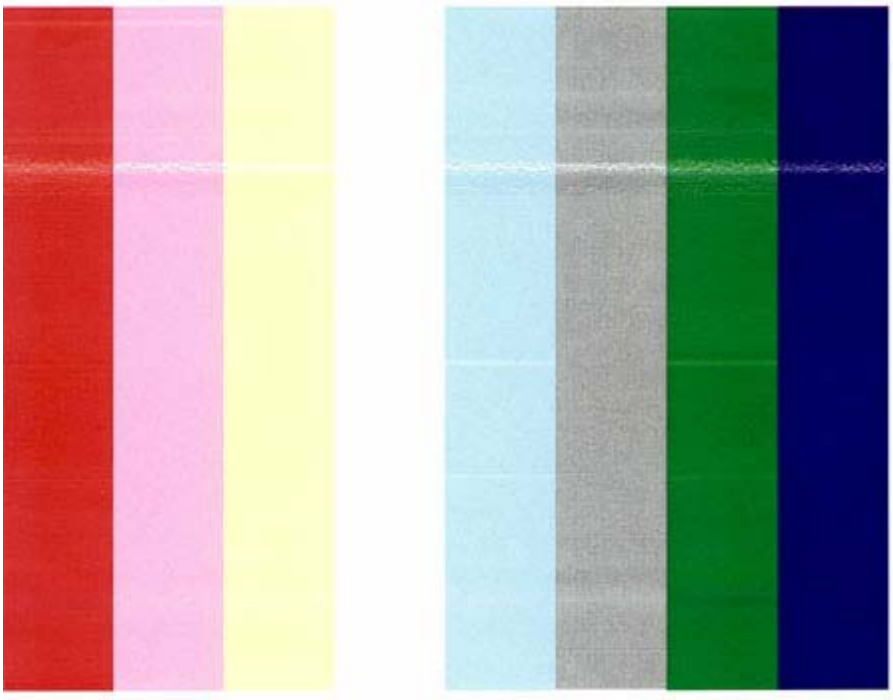
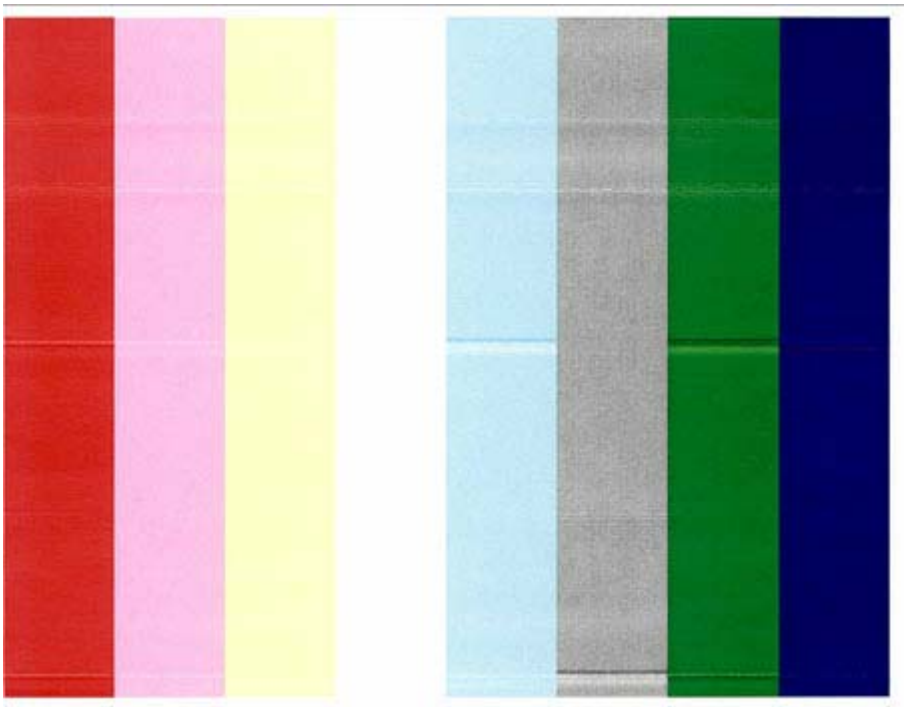


Figure 43: Fuser Flats (3 of 3)



Defect description

Bands of gloss or density differences. Repeats at fuser frequency (140 mm bottom and 148.5 mm top).

Possible causes

Flat roller spots in the fuser roller caused when the printer failed to separate fuser rollers due to abnormal power down. Printer usually has to stay powered off for a long period of time to cause the flat spots. Failure to separate rollers may be due to power plug being pulled before the printer can power down gracefully. Instruct customer to shut power down before pulling plug. Flat spots on fuser rollers cause pressure differences while fusing.

Troubleshooting and suggestions

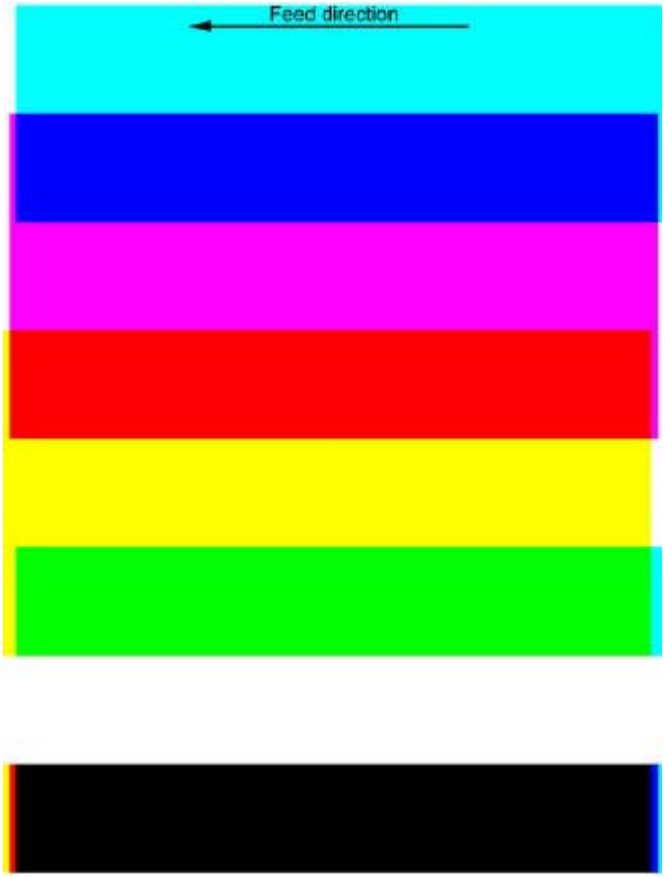
1. Run the printer for a while. The problem may correct itself sufficiently.
2. Replace fuser unit, if necessary.

top

ITB drive gear slip (color plane misalignment)

Frequency 4

Figure 44: Color plane misalignment



Defect description

Color planes drop significantly out of alignment (2 to 5 mm) once on a page. May happen once every few pages.

Frequency of one per page suggests that this is not a broken gear tooth.

Possible causes

Interfacing gears between ITB assembly and drive mechanism slipped once, then interfaced correctly.

Troubleshooting and suggestions

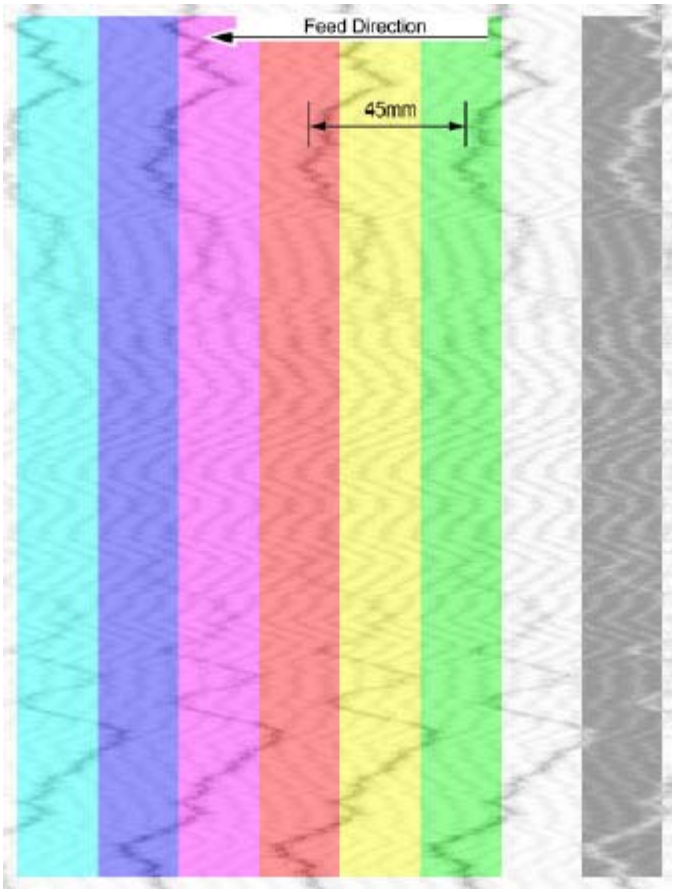
1. Inspect interfacing gears between the ITB assembly and the ITB drive mechanism.
2. Verify the ITB is seated and latched correctly.
3. Replace ITB assembly or ITB drive mechanism if either is damaged.

top

Dunes

Frequency 4

Figure 45: Dunes



Defect description

Wavy patterns that look like sand dunes in a single color. Note that the pattern is black and is reversed in black and carries over onto other colors. Note repetitive at about 45 mm (but if charge roller skids, it could stretch to about 50 mm).

Possible causes

Image Drum charge roller contamination - in this case, black.

Troubleshooting and suggestions

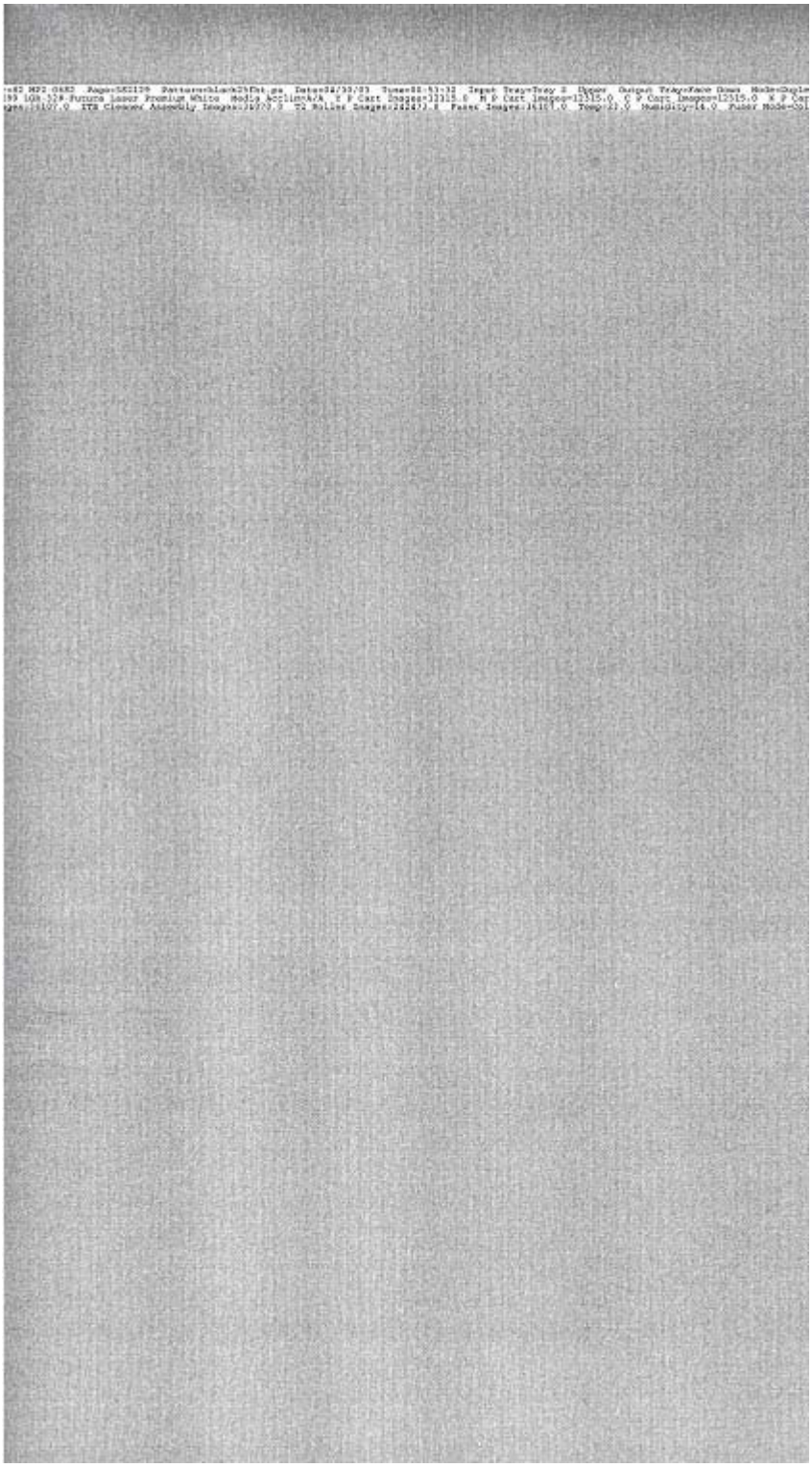
1. Run PQ assessment pages to isolate to a single color plane - in this case black.
2. Reseat or replace process cartridge matching the pattern color.

top

Belt wave

Frequency 4

Figure 46: Belt wave



Defect description

Alternating light and dark streaks running parallel to the feed direction. Streaks appear approximately 30 mm apart and are more noticeable on 11x17/A3 size media. The sample shows the waves extending the entire length of the paper. Often, the waves appear more on the leading or trailing edge of the paper, rather than the entire length of the paper.

Possible causes

ITB waviness.

Troubleshooting and suggestions

1. Print a darker scale or different pattern.
2. Change media.
3. Replace the ITB

top

Front or rear edge drop out

Frequency 4

Figure 47: Front or rear edge drop out

Defect description

Feathered streaks or missing toner near the edge of the page that corresponds to the front of the printer.

Possible causes

Poor secondary transfer at the front or rear of the engine, or both. Caused by ITB not correctly seated, or lever not in full up position, causing uneven T2 pressure.

Troubleshooting and suggestions

1. Reseat the ITB and be sure the green lever is fully raised.
2. Inspect and reseat the secondary transfer roller for correct seating and any binding of its vertical movement.

3. Reseat and latch the cleaning blade assembly in case the cleaning blade is interfering with the correct lift and positioning of the ITB.

NOTE:

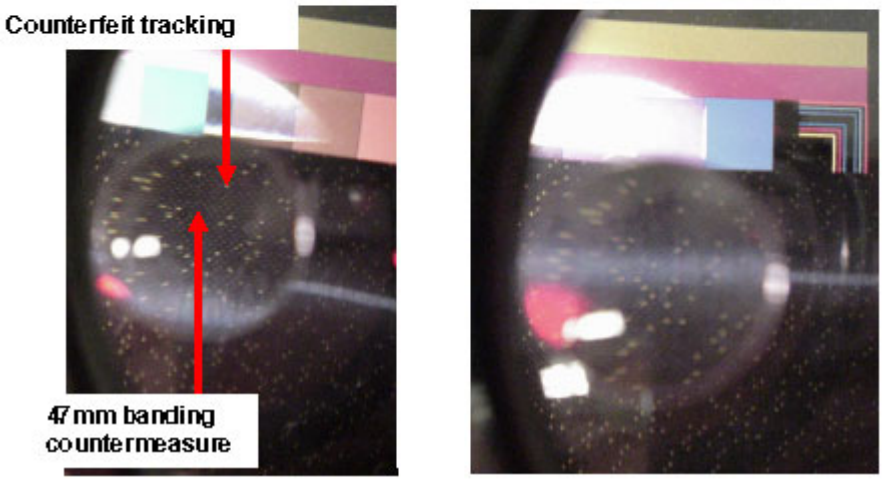
The toner collection bottle may interfere, so a cleaning blade mislatch may not be obvious.

top

Yellow dots - 47 mm bands

Frequency 4

Figure 48: Yellow dots - 47 mm bands



Defect description

NOTE:

The counterfeit tracking pattern is magnified. The lighter pattern helps to reduce 47 mm banding.

Very small yellow background dots all over the page.

Possible causes

The HP Color LaserJet 9500 uses a yellow dot background for counterfeit tracking. It also takes advantage of a yellow dot pattern to reduce banding (particularly at 47 mm from start of solid or heavy halftone fill).

Troubleshooting and suggestions

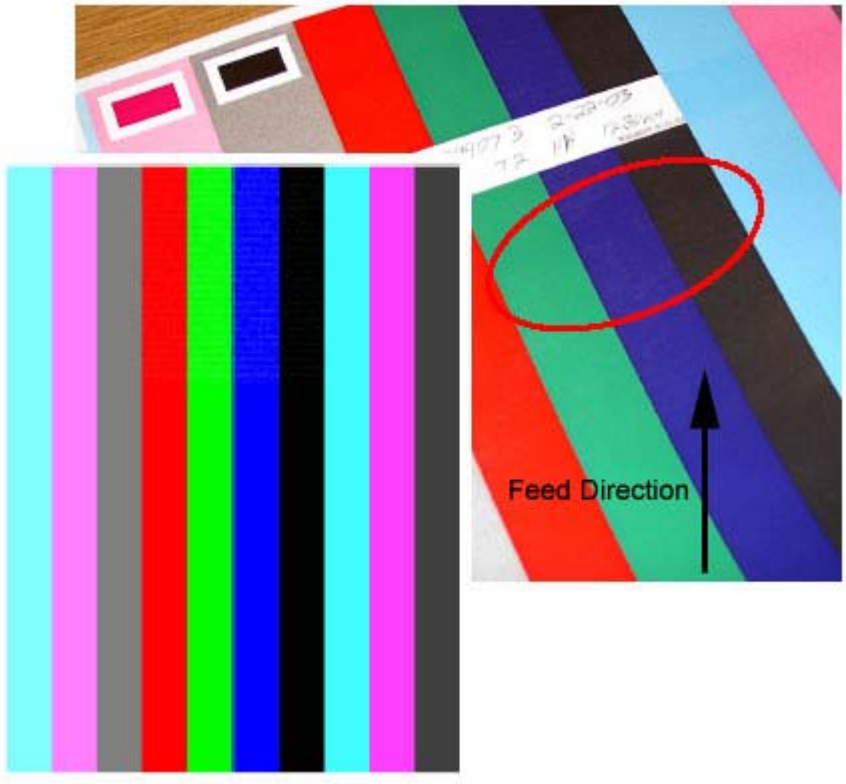
1. If the 47 mm band countermeasure is undesirable, it may be turned off via the control panel (CONFIGURE DEVICE, PRINT QUALITY, OPTIMIZE, HIGH COVERAGE 1, set to ON). The user may notice an increase in banding if they do so.
2. The anti-counterfeiting pattern cannot be turned off.

top

Gloss level variation

Frequency 4

Figure 49: Gloss level variation



Defect description

Banded (perpendicular to feed direction) gloss level differences that appear in heavy fills of

secondary colors. Defect only appears at the top part of the page. Only appears after a change in paper types that occurs over a very short period of time. Does not appear on subsequent pages. Does not appear in lighter fills or primary colors.

Possible causes

Fuser rollers have not sufficiently cooled down from the higher temperature used on the previous page printed in a different mode/paper type. The defect only appears on the top of the first page printed in the new mode as the media serves to cool the fuser rollers to the target temperature after the first fuser roller rotation or two.

Troubleshooting and suggestions

Currently, the only workaround is to allow a short cool down period between mode/paper type changes to allow the fuser to sufficiently cool down.

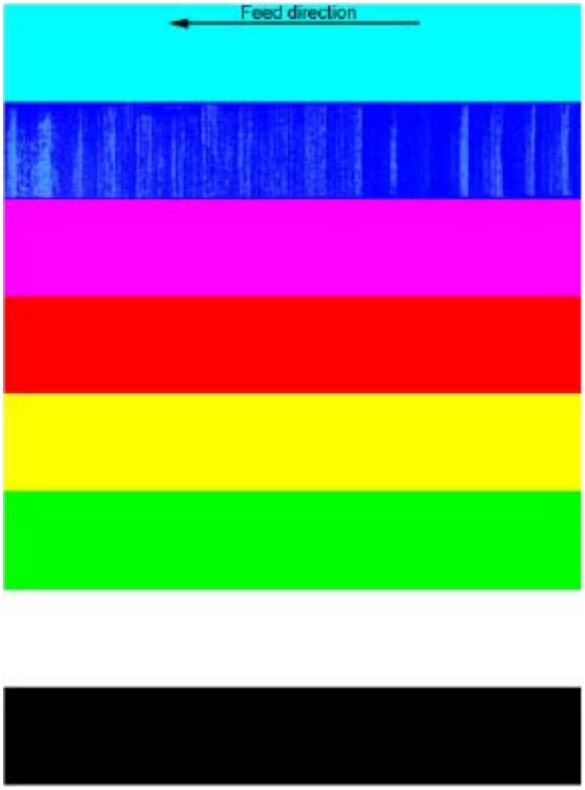
> **NOTE:**
>
> There is no hardware, software or firmware fix for this defect, only the work around mentioned above.

top

Fuser wrinkles

Frequency 5

Figure 50: Fuser wrinkles



Defect description

See process blue band of sample. There are two different kinds of defects.

- The defect shows a banded effect in secondary colors. The toner is fused and the media is not damaged.
- The defect shows a waviness in the media, but the fused toner looks OK.

Possible causes

1. Toner piles may become disrupted before fusing causing an irregular, wrinkled looking effect. Disruptions may be caused by physical interference in the paper path between the T2 station and the fuser, or static discharge (see also discharge marks defect samples) between the T2 station and the fuser.
2. Unsupported or poorly constructed media.

Troubleshooting and suggestions

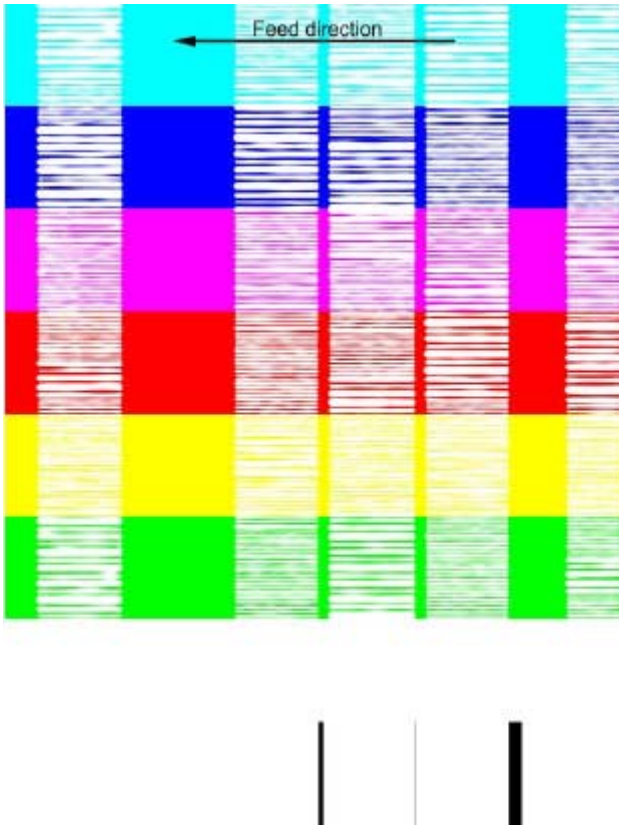
1. Inspect the paper path for physical obstructions.
2. Clean the fuser input (T2 discharge comb) as outlined in the Service Manual and User Reference Guide.
3. Check for supported media. Poorly constructed coated or glossy media may not survive the heat and pressure of fusing. Also, check for correct setting of paper type on the control panel.

top

Process cartridge drag

Frequency 5

Figure 51: Process cartridge drag



Defect description

Page-wide toner streaking. Toner is smeared in the feed direction across the entire page. In this sample, the K process cartridge did not engage with its drive gear when the cartridge was inserted. OPC drags on the ITB causing upstream colors to be smeared on the ITB and the stalled color to develop intermittently or not all.

Possible causes

- Mechanical - Image drum not properly engaged with drive, or drive/motor binding.
- Electrical - Image drum OPC drive motor not turning due to lack of power.

Troubleshooting and suggestions

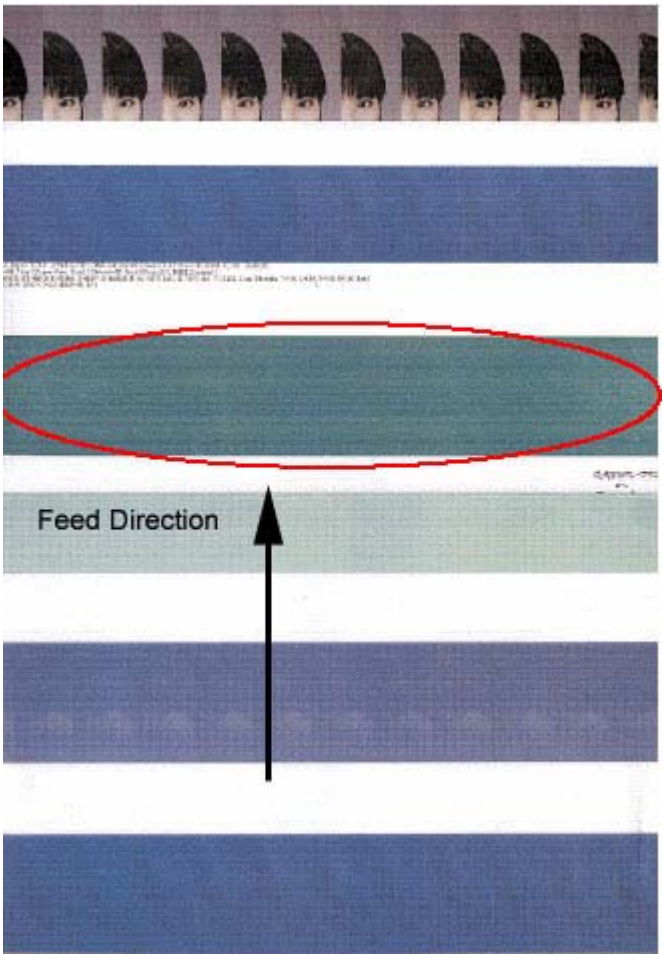
1. Mechanical - reseat or replace the image drum in question, check image drum OPC drive mechanism for binding, check gear/drive engagement, replace image drum motor assembly.
2. Electrical - check connections between motor and DC controller.

top

Toner agglomerations

Frequency 5 (This problem has been addressed with toner formulation changes prior to introduction.)

Figure 52: Toner agglomerations



Defect description

Toner gets a mottled look with random variations in density, particularly in greens.

Possible causes

Related to low coverage and toner particle size.

Troubleshooting and suggestions

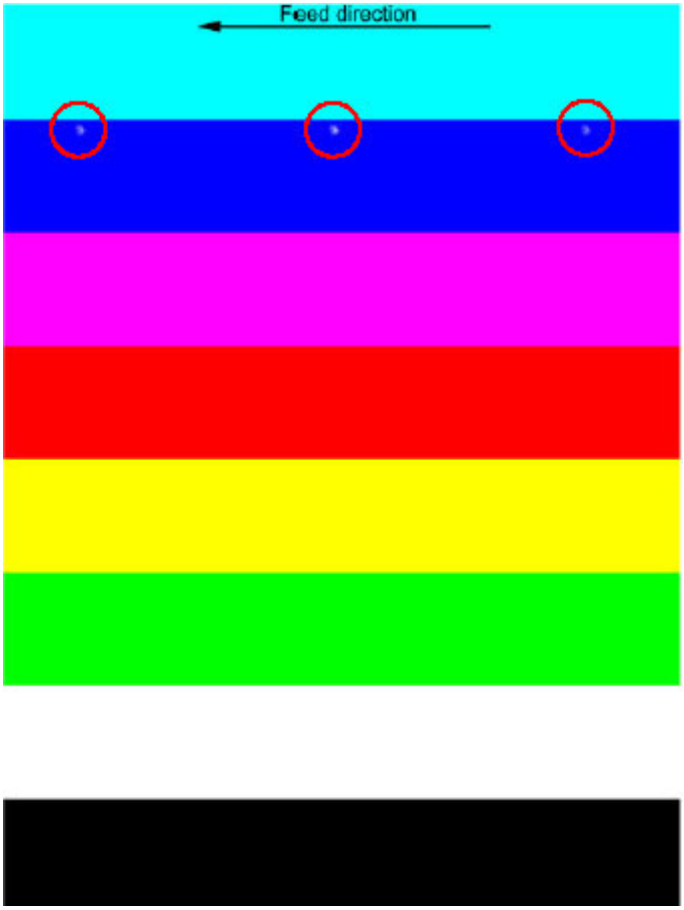
1. Run a PQ Troubleshooting set to isolate to a particular primary color.
2. As a workaround, shake the image drum and print cartridge of the particular primarily color suspected.
3. Replace image drum and/or print cartridge of the color suspected.

top

ITB backing roller T2 contamination

Frequency 5 (Pre-intro counter-measured ITBs keep almost all contamination out)

Figure 53: ITB backing roller T2 contamination



Defect description

Spot of missing toner that repeats every 72 mm in the feed direction. Note, this is the bottom roller of the ITB, the other two rollers in top corners of ITB are 100 mm circumference.

A foreign object dropped onto the backside of the ITB and lodged on the ITB Backing Roller.

Possible causes

Troubleshooting and suggestions

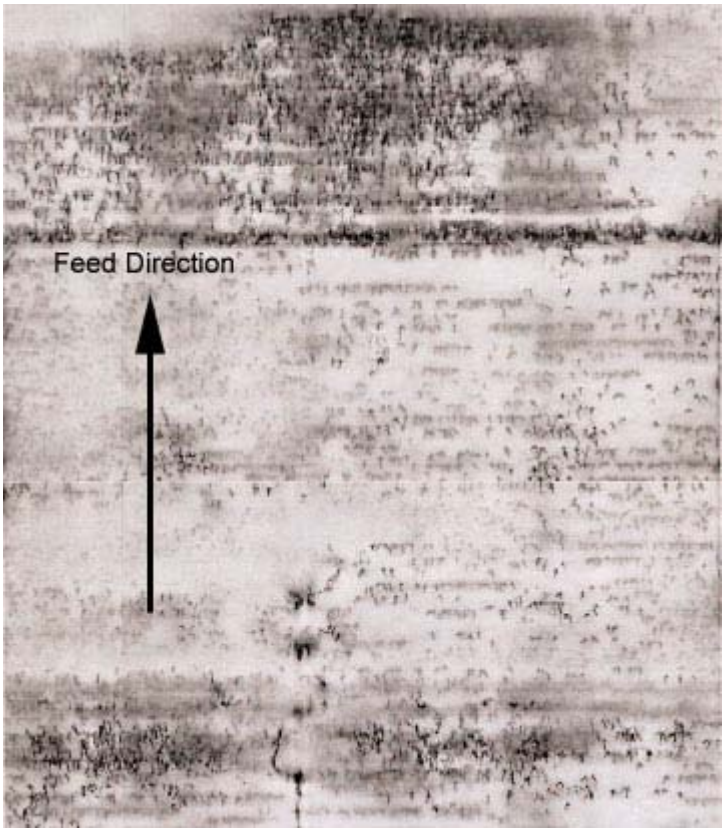
Inspect ITB backing roller and remove contamination, or replace ITB assembly.

top

T2 roller not raised (flock of birds patterns)

Frequency 5

Figure 54: T2 roller not raised



Defect description

Strange flock of birds discharge pattern independent of color plane.

Possible causes

Electrical transfer without physical contact transfer. Poor contact at T2 between paper and ITB, caused by clutch failure in T2 roller assembly, causing the T2 roller to not travel all the way into the up position.

Troubleshooting and suggestions

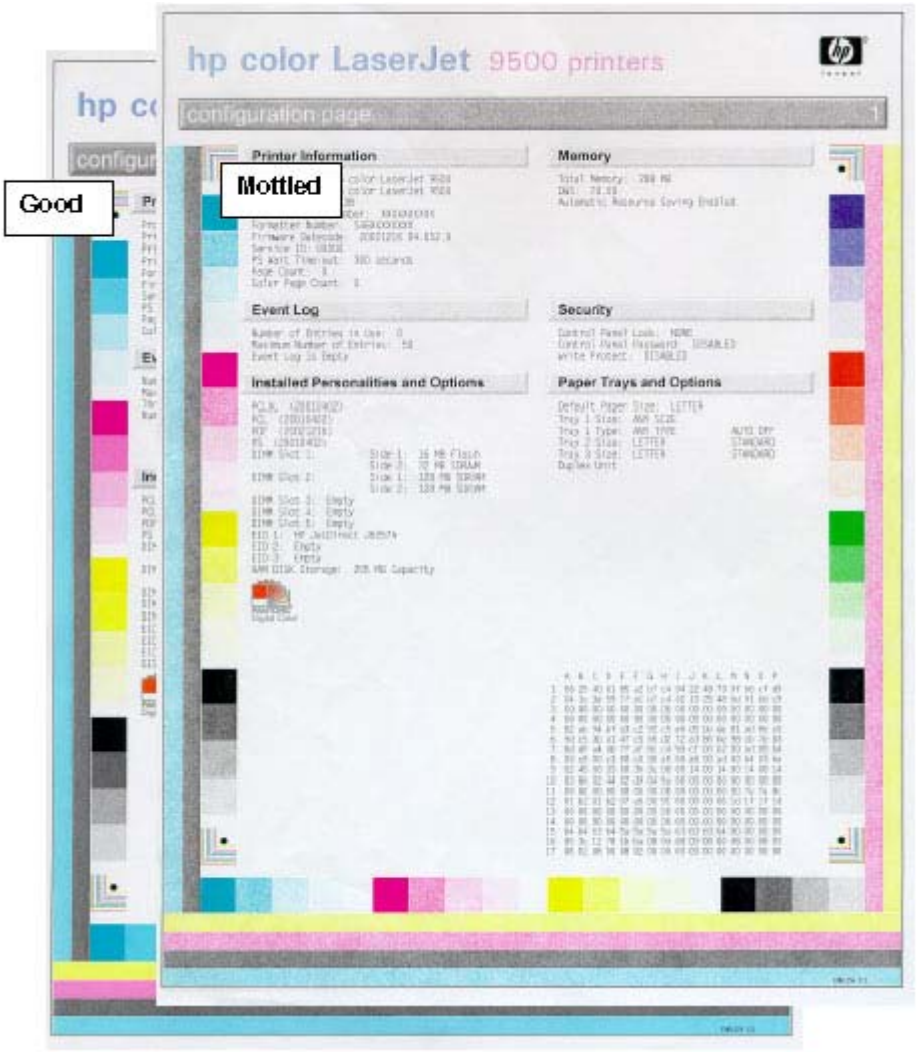
1. Visually, inspect the T2 roller (consumable) and T2 roller assembly (FRU) for correct installation and travel.
2. Check electrical connections to the secondary transfer assembly.
3. Replace the T2 roller, then replace the secondary transfer assembly.
4. If a high-voltage bias problem is suspected (generally not the problem with above sample), check HV paths for bent contacts from roller back to HVPS.

top

Mottled halftones

Frequency 5

Figure 55: Mottled halftones



Defect description

Halftone fills print with a "mottled" or light appearance. Random patterns of white appear in the halftone fills, looking very much like poor secondary transfer.

Possible causes

Poor secondary transfer caused by continuous low-coverage printing, usually on very rough media.

Troubleshooting and suggestions

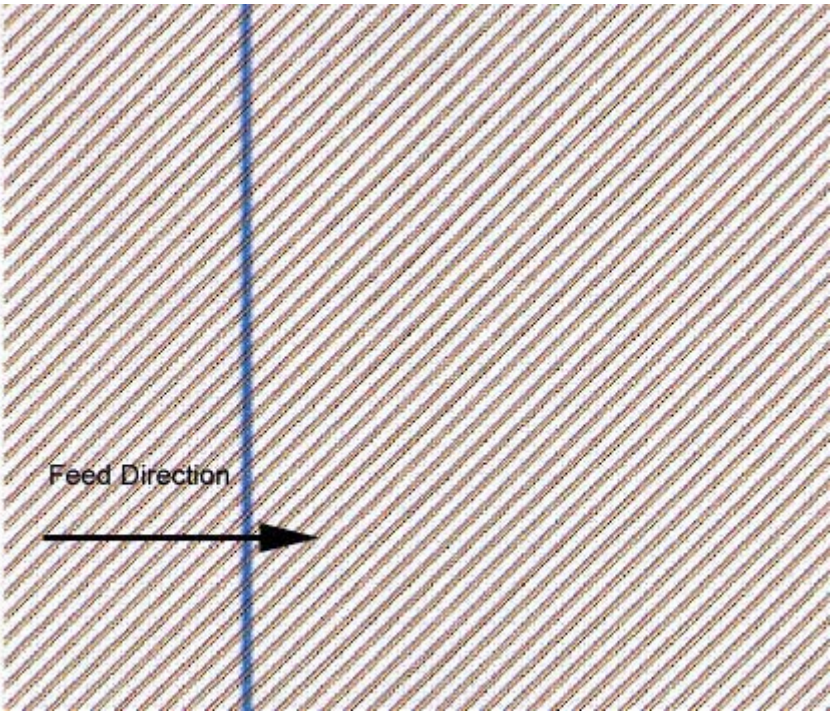
1. Use a smoother media.
2. Print higher overall toner coverage.

top

Arc - T2 bushing

Frequency 5

Figure 56: Arc - T2 bushing



Defect description

Hazy stripe, cyan in this case. Stripe is perpendicular to direction of paper feed and extends into the unprintable region of the page (not shown).

Possible causes

Poor contact shaft to bushing in T2 roller (consumable).

Troubleshooting and suggestions

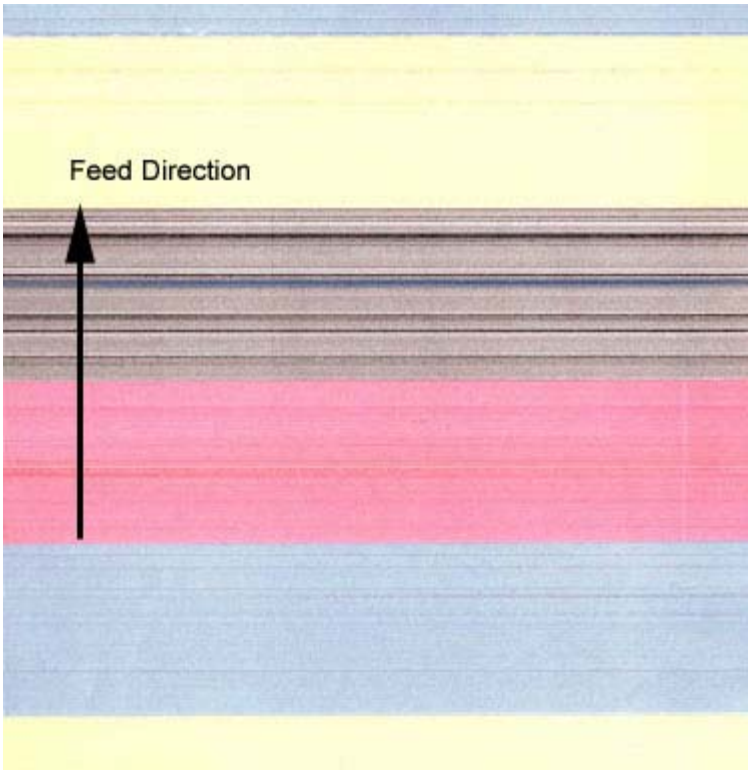
1. Replace the image transfer (T2) roller, which is where the contact bushing failed.
2. Check high voltage paths from T2 roller back to the HVPS for intermittent, bent, or corroded contacts.
3. Replace T2 roller assembly (FRU).

top

Arc - Post charger corona

Frequency 5

Figure 57: Arc - Post charger corona



Defect description

Very sharply defined bands that are irregularly spaced in all colors. Some lines extend into the unprintable region, not shown in the sample above. Occurs only when duplexing and only on the first side (printed page 2).

Possible causes

Poor connections along high voltage supply to post charger corona wire.

Troubleshooting and suggestions

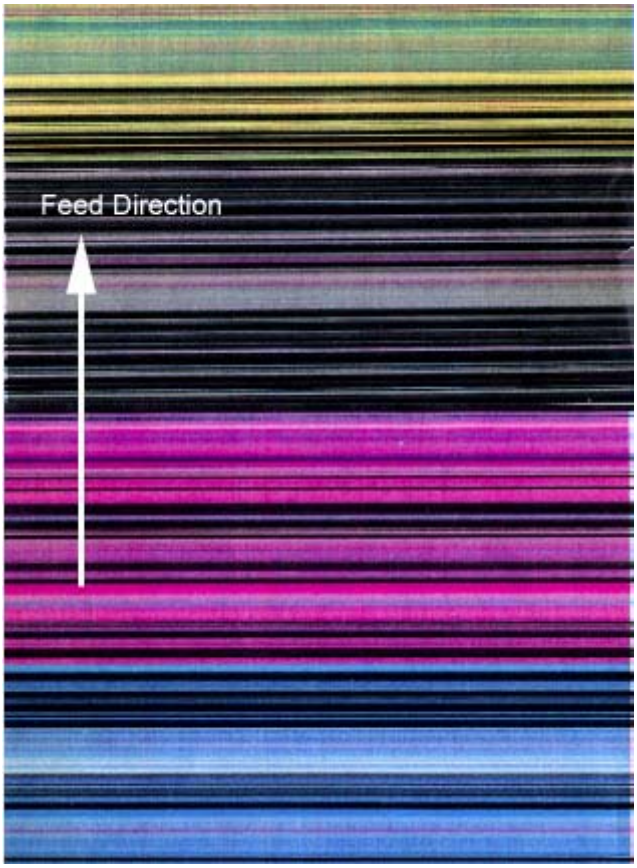
1. Check high voltage connections to post charger corona and ITB assembly grounds.
2. Reseat ITB assembly.
3. Replace ITB assembly.

top

Beautiful arc

Frequency 5

Figure 58: Beautiful arc



Defect description

An Arc occurred somewhere in the system that affected all parts of the system. Note the toner in the unprintable regions of the page.

Possible causes

Unknown

Troubleshooting and suggestions

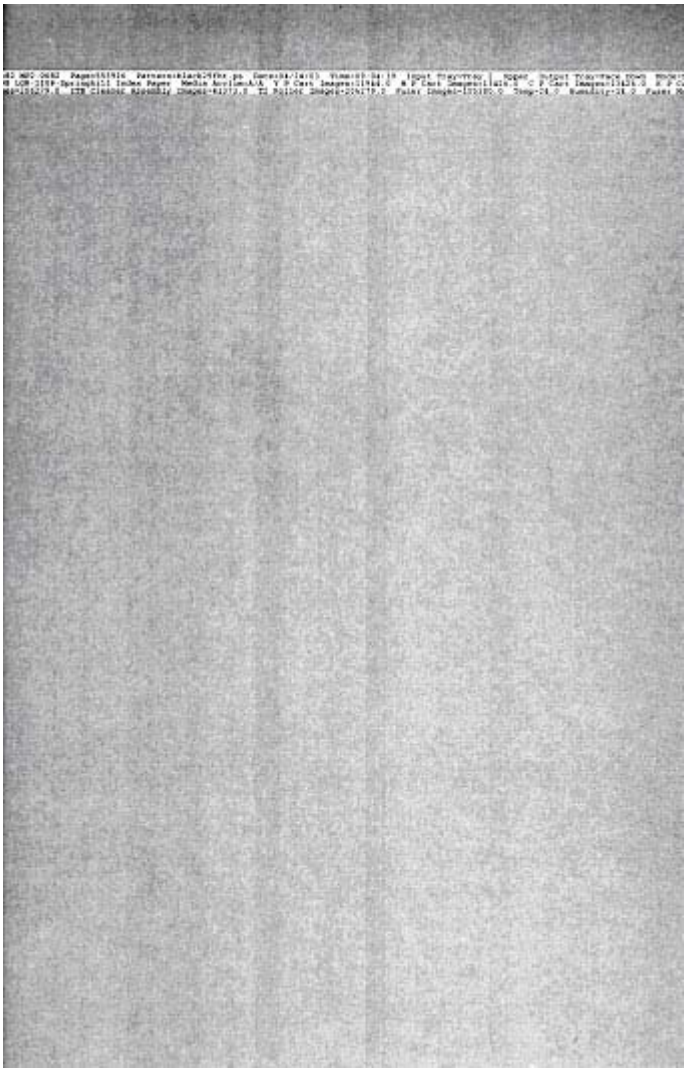
1. Run a color band test (multiple copies) with paper type set to a mode that runs half speed (HP Glossy) to attempt to isolate the problem to T1 or T2.
2. Inspect all connections on all high-voltage paths from ground back to the HVPS for damaged connectors, corrosion or anything else that might cause an open or intermittent connection.

top

4.5 mm streaks

Frequency 4

Figure 59: 4.5 mm streaks



Defect description

4.5 mm bands running parallel to the feed direction.

Possible causes

Contaminated cleaning brushes in an Image Drum. The brushes move back and forth on the OPC at a 4.5 mm amplitude. The contamination on the brushes causes the OPC to be more effectively cleaned in the area of contamination, which affects the final image in lighter or darker areas. The contamination may be caused by a loss or partial loss of high voltage to the brushes.

Troubleshooting and suggestions

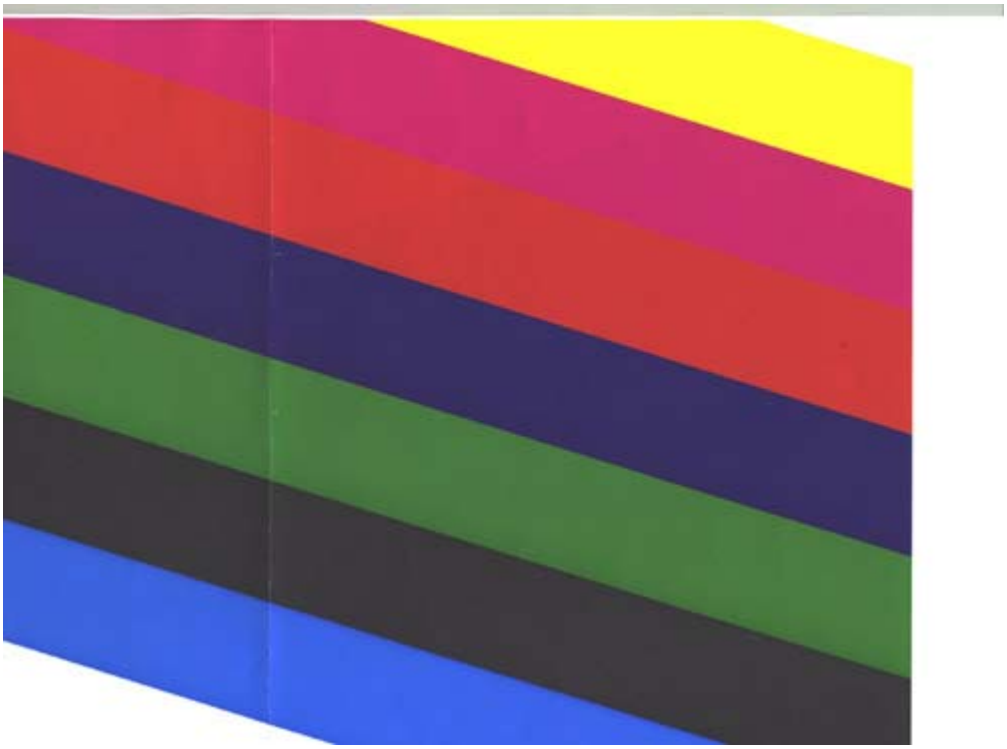
1. Run a set of PQ Troubleshooting pages to isolate the defect to a specific color plane.
2. Remove the indicated image drum and inspect the high voltage contacts on the drum and in the print engine for damage. Check the high voltage connections for continuity back to the HV power supply.
3. Replace the indicated image drum.
4. Replace the HV power supply.

top

Very narrow margin on long edge of duplexed 11 by 17 page

Frequency 4

Figure 60: Narrow margin on long edge of 11 by 17 size media



Defect description

With this defect both sides of a duplexed page have a very narrow margin on one long edge of the page. This narrow margin is on the same edge on both sides of the duplexed printouts. The yellow on the samples also appear to be much denser than normal.

Possible causes

Data may be corrupted or need to be flushed out of NVRAM.

Troubleshooting and suggestions

This ended up being resolved by performing an NVRAM reset.

top

Defects with no samples

Edge effect from contact developer

Frequency 5

Defect description

Dark/Light areas in fill areas around text characters.

Possible causes

Occurs at mid to latter part of developer life.

Troubleshooting and suggestions

1. Decrease fill percentage and problem goes away
2. Manual edge control setting in software?

NOTE:

Onsite visits and parts replacement (such as printer parts or consumables) will do nothing to alleviate edge effect. Do not dispatch onsite service or parts for this defect.

top